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TRADITIONAL SWAMPY CREE SNOWSHOE CONSTRUCTION

by

© KINGSLEY BENJAMIN BUSS

A THESIS
SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE
OF MASTER OF ARTS

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FALL 1978

THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled "TRADITIONAL SWAMPY CREE SNOWSHOE CONSTRUCTION" submitted by KINGSLEY BENJAMIN BUSS in partial fulfilment of the requirements for the degree of Master of Arts. in Physical Education.

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ABSTRACT

The intent of this thesis was to document material relating to and directly involved with traditional Swampy Cree Snowshoe construction from the time of European contact in 1671 to the present.

Written sources of information available to the writer were the journals, reports and letters of early Canadian travellers, traders and priests. A second source of information was the evaluation of authenticated samples of Swampy Cree snowshoes. The third source was the observation of contemporary Swampy Cree snowshoe construction carried on at the isolated Fox Lake Indian reserve.

The material relating to the construction of the Swampy Cree snowshoes were the construction of the tools used by the Swampy Cree men and women and those used by the European traders. These tools represented different cultures which were both evolving under different influences within the study period. The use of many of these tools was observed on the Fox Lake Reserve.

Contemporary construction of the Swampy Cree Snowshoes at Fox Lake gave most of the information gained in constructional processes. These in all cases were extremely simple and effective. A power drill and small table saw were used to speed up snowshoe production but were not essential for completion of the processes.

Ten pairs of authenticated Swampy Cree snowshoes were measured and evaluated. This provided enough data to suggest the main characteristics of Swampy Cree snowshoe design. It provided supporting evidence that the snowshoe construction at Fox Lake used traditional methods which have not changed over a great period of time.

Technological influences, such as the introduction of steel by the traders, was discussed with conclusions drawn which suggest that the Swampy Cree had a great influence on the tools manufactured for trade to them. Perhaps the greatest influence of all was the materials, birch and hide. These materials can only be worked in certain ways to certain limits, and it is these elements which have dictated to man the shape, size and form of his over snow devices.

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Chapter 1

THE PROBLEM

INTRODUCTION

"The construction of the snowshoe is a subject about which we know very little". With this sentence Davidson (1937:186) opens his chapter on snowshoe construction and netting techniques in his comprehensive 1937 article on snowshoes. The information which is available is often incomplete and in some instances misleading if the correct procedures are to be followed to achieve an accurate handcrafted duplication of an original pair of snowshoes. For example the writer feels Murdock's (1888:347,348) drawings of snowshoe lacing are both difficult to understand and show an unsystematic hexagonal netting technique. The apparent simplicity of, and the taking for granted of this universal means of transport has perhaps lulled us into the acceptance of the fact that there will always be snowshoes and persons capable of making them. Indeed snowshoes are made by the tens of thousands in the factories of Lorretteville, Quebec, Wallingford, Vermont, U.S.A. and other producers in North America. However, there is a great difference between mass production and traditional handcrafting methods of snowshoes.

Handcrafting of articles for use by the North American population has two major origins. The youngest handcrafting origin is that which belongs to the white settlers. The oldest belongs to the indigenous population of the varied regions of North America and represents cultures vastly different to those introduced in the last four centuries. The traditional native handcrafting of snowshoes is well described by Dickason (1972:69,70), who sums up the native's skill in design and construction as

> (seeking) to release the inherent qualities for a certain purpose which meant that design, shape and function had to be related one to the other as an integrated whole. The material was selected with function in mind: the shape was worked out as suggested by material; and decorations were fitted into space and shape available.

The snowshoe type which is associated more than any other with the exploration and early economic development of the Canadian West is the Swampy Cree snowshoe. This article made by the Indian craftsmen and women, and inhabitants of the fur trading posts, was not only an economic necessity but essential for survival in the long winter months. On the snowshoe the trappers and hunters travelled searching for life sustaining game.

Alternative methods of travel to snowshoeing have become available, and it appears that the traditional construction methods and processes of snowshoe construction could be lost. It is with this in mind that the writer has set out to document and bring together as much material as possible to bear upon the Swampy Cree snowshoe.

THE PROBLEM

The Problem is to determine the tools, materials and techniques of construction which have been used in the building of the traditional two piece pointed toe and tail Swampy Cree Snowshoe. The Problem can be divided into the following Sub-problems:

1) The determination of the main characteristics of the Swampy Cree Snowshoe.

2) The determination of the tools, the materials used in their construction, and the means of construction, which have been used by the Swampy Cree and inhabitants of the trading posts in the building of the Swampy Cree Snowshoe.

3) The determination of the materials, their processing and preparation for use, which are used in Swampy Cree Snowshoe construction at the present time.

4) The determination of the stages of construction and techniques used in forming and constructing the Swampy Cree Snowshoe.

JUSTIFICATION

Frequent references are made of travel by snowshoe over vast distances of Woodlands, Prairies and the Foothills of the Rocky Mountains. These references have been recorded in the Jornals of explorers, fur traders and missionaries since Europeans landed on the shore of North

America (Thwaites, 1901:247). Many snowshoe types have developed, as has been recorded by Davidson (1937:21), but none, in the period of recorded history, have been used over such a wide area as the Swampy Cree Snowshoe.

Swampy Cree Snowshoes are made of materials which deteriorate rapidly and without constant care through regular maintenance soon become damaged beyond repair. With their inherent fragility few authenticated Swampy Cree Snowshoe samples older than 50 years are in existence today. Their replacement in the past has come from the hands of skilled craftspeople, who have learned their skills from their forefathers and subsequently passed down these crafts to their sons and daughters. Today these skills are not as prevalent, as the need to travel in the bush, to hunt and trap for a livelihood has diminished greatly, and other forms of transport, such as the oversnow vehicle, are more efficient in time and human energy.

While there are many historical references mentioning snowshoes, only an occasional general clue can be gleaned as to their construction. The exact techniques of Swampy Cree Snowshoe construction used in the past are not known. However, it is known what tools were available to the Swampy Cree population (Woodward, 1948:3-6). The exact use of these tools and their capabilities in the hands of skilled craftspeople during these early years can only be surmised.

The construction, techniques and processes of handcrafting the Swampy Cree Snowshoe stand to be lost because of the lack of permanent written records and the gradual demise of this form of travel. Hence the need for this historical work.

METHOD AND PROCEDURES

Three sources of information are available to determine the traditional handcrafted methods of Swampy Cree Snowshoe construction. The first is to visit an area relatively unaffected by contemporary life styles where traditional handcrafted snowshoe techniques are in use. The second source is to examine traditionally constructed snowshoes contained in museums and collections across Canada and which have been atributed to the Swampy Cree. The third source is to read the historical journals, reports and letters of explorers, traders and priests who passed through or lived in the Swampy Cree area during the timespan under study.

The area chosen for the observation of traditional handcrafting methods was the Fox Lake Indian Reserve situated sixty miles due East of High Level, Alberta. Travel in this area is limited by the low lying marshy terrain. Access can be made by aircraft in the summer and winter. A ten hour overland journey by a fourwheel drive vehicle can also be accomplished in winter.

A detailed record of all stages of snowshoe construction was to be recorded in writing, on black and white film, on colour transparencies and super 8 film for the purpose of supporting the accuracy of the description. An interviewer format was prepared with the potential areas of construction that were to be expected to be encountered laid out in sequence in Appendix I. The snowshoe classification and recording form for the Fox Lake Reserve Swampy Cree Snowshoe is to be found in Appendix II.

The second source of information came from the close examination and interpretation of data collected from snowshoes which have originated from the area inhabited by the Swampy Cree and are contained in museums and collections across Canada. An example of examination and interpretation technique can be taken from the narrow flat surfaces which together constitute a rounded crossbar. These can be attributed to the hand use of a crooked knife which makes a curve by a number of small flat cuts. Another example open to interpretation might be the reinsertion, in one frame hole, of the selvage thong which is prevented from being pulled through to the inside by a tuft of wool or moose hair. This will indicate an economy of effort and the probable laborious use of an awl with which to drill the hole. The data collected from these snowshoes was placed on the snowshoe classification and recording sheets to be found in Appendix II.

The third source of information from historical written material must go back to 1671. This date coincides with the large scale introduction of trade goods by the

Hudson's Bay Company into the hinterland fronting onto Hudson's Bay. This action was hotly contested by the French traders from Montreal, and at the end of the eighteenth century by the North West Company. There was, therefore, a constant European contact with this area through the function of trade. This trade required that trading company representatives be present in their respective territories throughout the year. Journals, letters and trading accounts of these inhabitants are contained in the Hudson Bay Record Society series, the Champlain Society series and other various accounts. The Jesuit Relations and Allied Documents series covers in part the timespan and area in question, and represents the Jesuit priests' observations. More recent written material are available from Anthropological papers and reports. Technical data on crafts and handcrafting processes, which have not changed during the study period, will be made from contemporary sources.

Authenticated Swampy Cree snowshoes will be analysed as to varying ratios which exist between the basic dimensions. A detailed analysis of the cross sections of the main frame will be carried out and interpreted in relation to the desired performance of the snowshoe. The Fox Lake Cree snowshoe will be included in the sample of eleven pairs and a comparison will be made between it and the remaining pairs.

A final section will discuss the influence of changing technologies on the methods of construction of the Swampy Cree Snowshoe. A summary and conclusions will be drawn in the concluding chapter.

DELIMITATIONS

1. The time period considered for this study is from post European contact with the Swampy Cree at Hudson's Bay in 1671 (Thwaites, 1899:157,177) up to the present time of 1975.

2. Davidson (1937:70) and Skinner (1911:44) have determined that the two piece frame, with pointed toe and tail, is the representative snowshoe of the Swampy Cree Indian.

3. The area for collection of snowshoe samples considered as being representative of the Swampy Cree was that described by Jenness (1955:284) and Skinner (1911:8).

4. An isolated Swampy Cree Reserve, known as Fox Lake Indian Reserve Number 162, was chosen for study of Snowshoe construction as its location would reduce external contemporary influence. The physical isolation of this band is almost complete.

5. Snowshoes made on the Fox Lake Reserve, and which complied with the Swampy Cree design as laid down by Davidson (1937:70) and Skinner (1911:44), were used as examples representative of traditional snowshoe construction.

6. Ten pairs of Snowshoes, preserved in various museums, all falling within the Swampy Cree design as laid

down by Davidson (1937:70) and Skinner (1911:44), are used as samples representative of traditional snowshoe construction. They are presumed old as they have evidence of tool marks on the frame and crossbar surfaces and exhibit no traits of machine tool work, such as perfectly smooth flat surfaces or ripples, coming from machine planing. Dates as supplied by the respective museums confirmed the age of some of these pairs of snowshoes.

7. Accessories to the snowshoe or related to this mode of travel in any way, whether physical or spiritual, e.g. wool balls or amulets, are not covered in this study as they are not considered structural components of the frame and lacing.

LIMITATIONS

1. The Swampy Cree area of habitation, prior to 1671 and up to 1975, including their expansion, migration and population losses caused by disease, covers a wide range of geographic, climatic, flora and fauna conditions.

2. Geographic locations forced the Swampy Cree to use alternative materials which had inherent property limitations that resulted in a less precisely defined Swampy Cree Snowshoe.

3. European steel trade goods were being distributed to the Swampy Cree Indians prior to the commencement of trading with the Hudson's Bay Company in the James Bay and Hudson's Bay area.

4. The oldest Swampy Cree snowshoe known to the writer is housed in Vancouver Centennial Museum and dates from 1847. This date is 176 years after the first European contact with the Swampy Cree on Hudson's Bay in 1671, and it can be assumed that it represents a refinement in craftsmanship and design of earlier times.

5. Dating procedures, identification of snowshoe types, the conciseness of written journals and all other related material is presumed to be accurate and free from flaws.

6. The introduction of an electric generator in the Fox Lake settlement in 1963 has allowed the use of a hand drill and small tablesaw in the construction of snowshoes since that time.

7. The external influence on the construction of Swampy Cree Snowshoes could not be eliminated. Radios, television and literature are readily available to the craftsmen and women on the Fox Lake Reserve.

8. Indian Affairs economic development officers have helped plan the co-operative of the manufacture and sale of snowshoes. However, the design and guidance for the construction of the snowshoes comes from the older members of the reserve.

DEFINITION OF TERMS

Asymetrical, vertical axis. A point on the frame where the cross section shows a shorter vertical outside height to a larger internal vertical height.

Authenticated samples of Swampy Cree snowshoes. Snowshoes which have been collected from the area in which the Swampy Cree have resided and have the characteristic two piece frame, pointed at the toe and tail (Davidson, 1937:66) (Skinner, 1911:44).

Awl. A pointed instrument for marking surfaces or piercing small holes in wood or leather.

Auxillary crossbars. A wooden crossbar connecting and holding apart the two sides of the snowshoe frame in the front or back sections of the snowshoe. The lacing is woven underneath it. It has two functions. 1. Holding apart the snowshoe frame. 2. Preventing snow pressure from pushing in the lacing.

Babiche. Thread or thong of sinew, gut or rawhide, also called lacing.

Baler twine. A thick, coarse twine made from hemp which is usually used to bind bundles of straw or hay.

Beamer. A bone implement like a drawknife made from the metapodal bones of deer and having a cutting and scraping edge between the handles. It can also be called a scraper.

Bloomery. A furnace and forge in which wrought iron blooms were made directly from the ore or, more rarely, from cast iron.

Body weighting. The act of putting your weight on a snowshoe.

Cambium layer. The layer between the wood and the bark of a tree. In the case of birch it is a soft brown material, crumbly in texture.

Carbon, carbonaceous material. Material which has a high percentage of carbon material in it. This carbon material can be pure carbon, animal horns or charcoal.

Case hardening. A process where carbon is introduced into the surface of mild steel or low carbon steel by heating the material, in the absence of oxygen, in a bed of carbonaceous material.

Cementation furnace. A furnace used in the long, slow heating of wrought iron in a matrix of carbon, to produce blister steel.

Chisels.

- Gouge. A half rounded chisel which can be bevelled on the inside or outside. If sharpened on the inside, it is called a scribing gouge.

- Socket. Socket refers to the hollow tapered end of the chisel which holds the wooden handle.

- Bevel. Bevel refers to the edges of the chisels which have been ground off so it can reach into lateral acute angles.

- Mortice. A strongly made square edged chisel used for cutting deep down into a mortice and levering out wood which has been cut.

- Firmer. A stongly made chisel which has square edges and is used for general chiseling work.

Composite fineness figure. A numerical figure indicating the fineness of the weaving of a snowshoe. It is determined by adding together the number of hexagonal patterns shown in a 2 inch lateral measurement of all three sections of a snowshoe.

Compression fracture. A fracture which occurs on the inside of the snowshoe toe curve. It is characterized by a series of small ridges, at right angles to the grain where the wood has not held together and as a result delaminated.

Contemporary. Originating at the present time.

Contemporary Swampy Cree snowshoe. A snowshoe made by the Fox Lake Swampy Cree in 1975.

Cottage industries. British rural industries based in or close to a workman's home. They used primary materials of wood, straw etc. to produce a product for use locally or for sale at a local, central marketing centre.

Crooked knife. Synonymous in this work with Canoe knife, Man's knife, Mocotaugan. A knife which has a steel blade curved at the tip. The wooden or bone handle is bent or curved away from the user to allow it to be held in an underhand grip and pulled towards the individual. It is either left or right handed, but not both. Used only by male members of the indigenous North American population.

Draw knife. A two handled blade used to cut off thick shavings from the wood of the snowshoe frame and so reducing it to the correct shape.

End grain. The texture of the fibres at the end of a longitudinal piece of wood. The fibrous nature of wood seen from the end as opposed to viewing from the side.

Expansion fracture. A fracture which occurs on the outside of the snowshoe toe curve. It is characterised by a series of delaminating splinters and cracks going into the frame longitudinally.

"Faggots". A collection of four to six bars of blister steel bound together for the production of German steel.

Flaying. The process of removing the hide from an animal.

Fleshing. The process of removing fat, fascia and meat from the inside of a hide.

Fox Lake Reserve. The area as administered by the Federal Government Department of Indian and Northern Affairs and known as IR 162 at Fox Lake.

Free water of fluids. Water which separates from or is not contained in another material such as wood or hide.

French knife. A large clasp knife, up to 6½ inches long, with a single blade. A locking mechanism prevented it closing on the owner's fingers. Originated in France.

Green hide. A hide which has been flayed but no other processes carried out on it.

Hand craft. The making or manufacture of articles using simple handtools only.

Jack knife. A small pocket knife with one or more blades. It has no safety locking mechanism.

Jigs. A pattern or guide for repeatedly forming material to a pre-determined exact shape.

Lacing. The material which is woven to fill in the spaces contained within a snowshoe frame. Generally made of rawhide but can be of string, bark or any material which lends itself to weaving and filling in the frame. Also called babiche.

"Made Beaver","MB". The Hudson's Bay Company standard unit or price evaluation. It was equivalent to the value of a prime beaver skin taken in winter, and the prices of all trade goods, other furs, and country produce were expressed in terms of MB.

Maul. A heavy hammer with a wooden head.

Mortice. A rectangular square edged recess cut into wood at right angles to its grain. Receives a tenon into its space which is held firmly. See tenon.

Multiple tension support. A continuous rawhide lace threaded through a hole in the frame and pulling together the two frame sections in the toe.

Offering up. A process of measurement whereby a size is taken directly from one marked distance on an object to another unmarked object. A means of comparing different sizes as to one being larger or smaller. Estimation of size are judged by eye only.

Outfit. A term given by the Hudson's Bay Company to a unit or shipment destined for a trading post. It can also describe the goods purchased by a trapper or individual trading at a trade post and generally all living necessities for an extended period of time.

Rawhide. The animal skin which has been processed by hand to remove the fascia and fat on the inside of the hide and the hair on the outside. Chemicals are not applied to the skin at any stage of the process and stretching or curing by smoke are not carried out.

Refractory chests. Chests made of non metallic ceramic substances able to withstand high temperatures.

Rochberry knife. A folding pocket knife with a pronounced curve on the blade side when it is closed. The name is derived from the likeness to a roach's belly (Rich, 1946: 171n).

Scraper. This tool is used for scraping the hair from an animal skin. It has a steel blade set at right angles to its handle. This name can also be applied to a bone beamer.

Scraping. The process of removing the hair from the outside of a hide with either a beamer or scraper.

Selvage thong. The lacing which is threaded through the toe and tail sections of a snowshoe frame and crossbar, but not the centre section. The lacing is attached to this and so economises on the length of material used and the weight of the pair of snowshoes.

Shaving horse. A four legged slab of wood with a foot operated lever which holds down wood while it is being worked on with a crooked knife.

Slag. A product of smelting containing, mostly as silicates, the substances not rendered into the pure ore. It floats on the molten metal surface.

To "slip" or to "let slip". The process through which the hide will go when it is allowed to be exposed to the air. A decomposition takes place which causes the hair to rot in its follicle and slip out when pulled or scraped.

Slitting mill. A mechanical means of dividing strip or sheet iron into narrow strips (Gale, 1967:26).

Steeling. The process of inserting a high carbon steel cutting edge to an iron axe head. An overcoat or insert method is used to weld in the steel cutting edge.

Steel. Steel is an alloy of iron, carbon, and other elements, but it contains less carbon than cast iron and more than wrought iron... Steel with a carbon content of over 0.25 and up to 0.5 per cent is called medium carbon steel and above 0.5 per cent it is called high carbon. The upper limit is about 1.4 per cent (Gale, 1967:14,15).

Steel, blister. The carbonisation of mild steel (contains up to 0.25% carbon) by the process of cementation. Carried out by packing bars of the best quality wrought iron with charcoal in closed clay vessels and subjecting the vessels to the heat of a furnace for anything from seven to ten days (Gale, 1967:35,36).

The bars were covered in blisters, hence the name. The steel lacked homogenity because it contained slag. Steel improved after 1740 because the blister steel was melted and the slag skimmed off.

Steel, German. Produced by tying bundles of blister steel bars together and heating them in a non oxidizing furnace, they were then welded together so distributing the carbon present in the blister steel throughout the mass.

Steel, tempered. A piece of high carbon steel heated to the required colour range and quenched in water, salt or oil. Depending on the colour of the steel (and consequently the temperature), a variety of steel hardnesses can be obtained.

Stroud. A woollen cloth made in the Cotswolds of England, at Stroud, the centre of the English wool industry in the seventeenth to nineteenth centuries.

Swampy Cree. Those persons indigenous to the areas as defined by Jenness (1955:264) see Map I on page 24.

Swampy Cree snowshoe. A wooden two piece frame, pointed at the tip and tail and held apart by two or more crossbars. Around this frame rawhide lace or an equivalent material has been woven. The toe is upturned and the lacing is in a hexagonal pattern (Davidson, 1937:70).

Tang. An extension of a blade or tool onto which a handle is fitted.

Technology. A word encompassing a group of techniques relating to a particular manufacturing skill or way of performing a series of manipulative activities with tools on materials.

Technique. A mechanical skill in Art. The part of artistic work that is reducible to a formula, e.g. the snowhoe frame sides have to be thinned at the toe to a horizontal rectangular cross section to allow for bending and prevent compression or expansion fractures.

Tenon. A rectangular square edged tongue which projects from the end of a piece of wood in line with the wood grain. It is placed into a mortice. See mortice.

Ticketer. A piece of high carbon steel used to prepare a sharp edge on a softer piece of steel. It can be any implement which is harder than that which is being used, e.g. a pair of scissors as used by the Fox Lake Indians on their scraper blades.

Ticketed edge. An edge prepared on a hide scraping tool with a ticketer.

Traditional Swampy Cree snowshoe. A snowshoe made by hand and retained in City, Provincial and Federal museums and collections and which have been directly attributed by their cataloguers to being constructed by the Swampy Cree. Its frame structure has two pieces pointed at the toe and tail.

Traditional handcrafted construction methods. The processes of hand techniques and manipulation of hand tools which have been used in the past in a specific locality.

Trait. A characteristic of behaviour or a typical artifact that distinguishes a human culture.

Twca Cwm. A long handled knife with a curved blade which was used for hollowing out wooden bowls and spoons in Wales, Great Britain.

Woman's knife. A rigid straight handled knife sharpened on one side which can be used in either the left or right hand. Used mainly by the female members of the native population.

Wrought iron. "A commercially pure iron, of fibrous form, physically mixed with slag" (Gale, 1967:13). Contains 0.02-0.08 % of carbon. An extremely malleable material relative to steel.

ORGANISATION OF THE THESIS

The main purpose of this thesis was to gather together as much information as possible regarding the Swampy Cree Snowshoe. From this information and the data gathered from examination and measurement of authenticated samples of Snowshoes, a definition of a Swampy Cree Snowshoe was hoped would emerge. This defining will encompass not only its physical structure but also the construction techniques and the tools used to make it. To these ends this thesis was structured in the following manner.

The first chapter introduces the subject and defines the areas and subject matter to be covered. Chapter two goes into the migration patterns of the Swampy Cree and their allies, the Assiniboine. It also places the Hudson's Bay Company in perspective in relation to the importance of the snowshoe in the fur trade economy.

The tools for making snowshoes originated from two entirely different cultures. The original tools for snowshoe construction came from the indigenous peoples of this area. However, the Hudson's Bay Company brought steel into the Swampy Cree areas which led to the manufacture in Europe and in the trading posts tools which catered specifically to the natives' requirements. Tools used by the inhabitants of the trading posts were brought over from Europe and represented the specialist tools of a large number of European crafts. Chapter three covers the types of tools, their uses and their construction by both natives and inhabitants of the trading post.

Chapter four deals with the construction of the snowshoe and represents material gleaned from journals emanating from the study area. Notes taken while observing the Fox Lake Swampy Cree are also incorporated into this chapter and represents direct evidence of snowshoe construction.

Attempting to define and quantify an article is difficult. Chapter five attempts to do this with ten pairs of Swampy Cree Snowshoes selected with a great deal of care to ensure authenticity. The bulk of the snowshoes came from the Hudson's Bay Collection of artifacts which are kept at Lower Fort Garry, Selkirk, Manitoba. The others came from the collections contained at the Vancouver Centennial Museum, Vancouver, British Columbia, and the Alberta Provincial Museum and Archives, Edmonton, Alberta.

Throughout the study period of this thesis great developments in technology have occurred. This was bound to have an effect on the lives and needs of the population using snowshoes within the Swampy Cree Area. Chapter six discusses this subject and brings into focus the variety of important changes which have occurred.

The summary and conclusions drawn from this thesis bring together what the writer feels are the future directions of study of this mode of transport.

Chapter 2

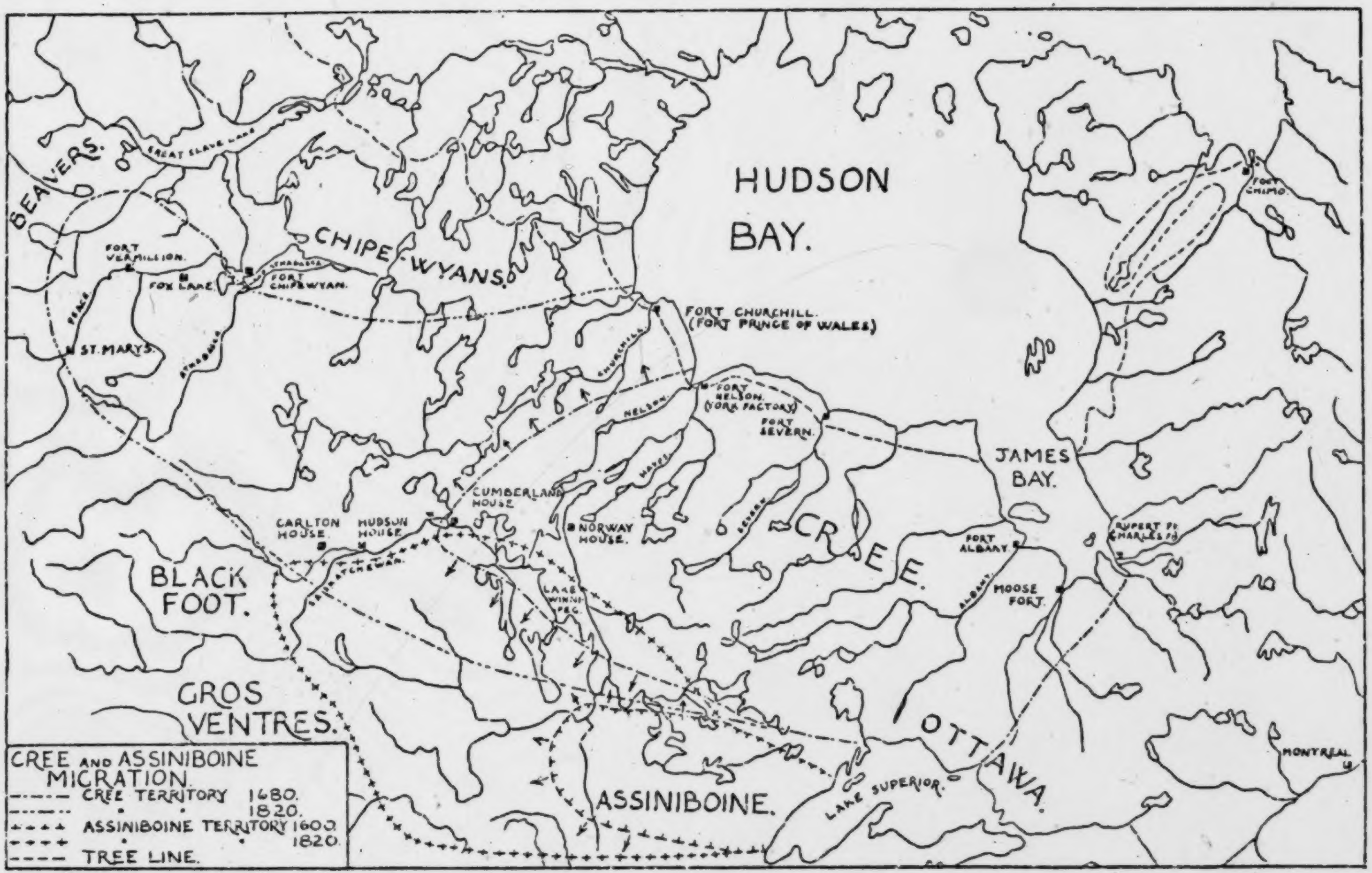
THE HUDSON'S BAY COMPANY, SWAMPY CREE MIGRATION AND THE SWAMPY CREE SNOWSHOE

The original range of the Swampy Cree (Map 1) at the time of European contact in 1671 was to the South of Hudson's Bay and East to the North shore of Lake Superior. From here the range extended North West to the Pas in Manitoba and thence to the North East to the mouth of the Nelson and Hayes Rivers of Manitoba on Hudson's Bay (Hlady, 1964:27).

In 1820 the Swampy Cree had almost doubled their range which now stretched from the South and West coasts of Hudson Bay to the plains in the South and continued in a broad sweep to the West, including the Peace, Athabasca and Slave Rivers and those areas close to the Athabasca and Great Slave Lakes (Jenness, 1955:283,284).

The migration West, and thus the enlarging of the Swampy Cree territory occurred when their steadily increasing numbers forced them to expand. Hlady states that the Swampy Cree needed large areas in which to live because the forests, lakes and rivers could support only so much wildlife upon which they depended for food, clothing and living their aboriginal way of life (1964:24).

The first European contact with the Swampy Cree occurred along Hudson's Bay in the summer of 1671 (Thwaites,


HUDSON BAY.
JAMES BAY.
BEAVERS.
CHIPEWYANS.
CREE.
OTTAWA.
BLACK FOOT.
GROS VENTRES.
ASSINIBOINE.
GREAT SLAVE LAKE
FORT VERMILLION.
FOX LAKE
FORT CHIPEWYAN.
ST. MARY'S.
PEACE
FORT CHURCHILL. (FORT PRINCE OF WALES)
FORT NELSON. (YORK FACTORY)
FORT SEVERN.
NELSON
HAYES
SEVERN
CHURCHILL
CUMBERLAND HOUSE
NORWAY HOUSE.
CARLTON HOUSE
HUDSON HOUSE
SASKATCHEWAN
LAKE WINNIPEG.
FORT ALBANY
ALBANY
MOOSE FORT.
RUPERT Ft. CHARLES Ft.
FORT CHIMO
MONTREAL
LAKE SUPERIOR.
CREE AND ASSINIBOINE MIGRATION.
CREE TERRITORY 1680.
1820.
ASSINIBOINE TERRITORY 1600.
1820.
TREE LINE.

Map 1. Territories of the Cree and Assiniboine prior to 1680, and their subsequent migration, to 1820. Place names, rivers, lakes and Indian tribes referred to in the text (Hlady, 1964:27,33) (Wonders, 1969:44,45)

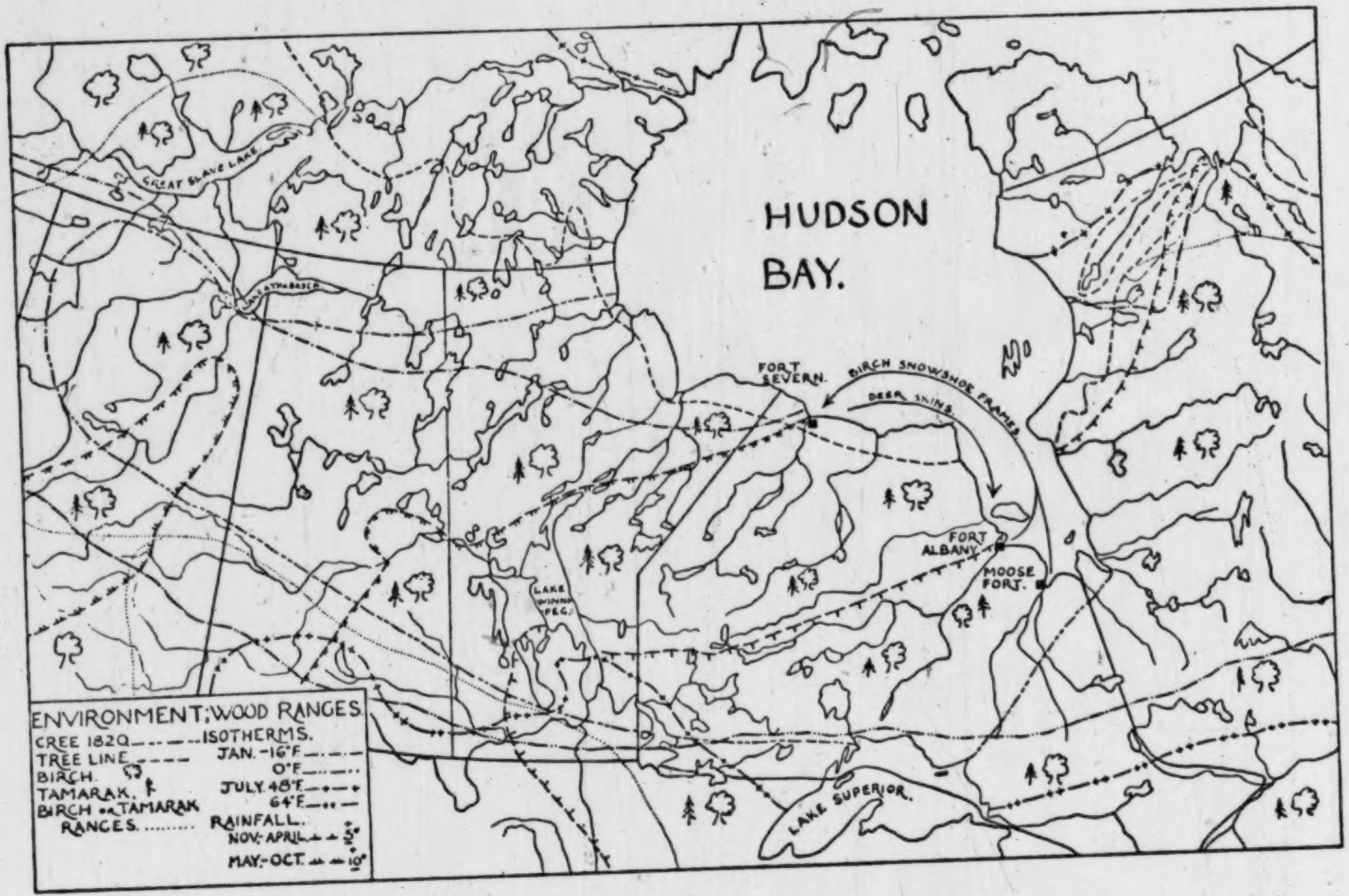
1899:157,177). The contact was made with the traders who represented the Hudson's Bay Company which was formed on May 2, 1670 in London, England (Rich, 1942:XV). With the trading presence of the Hudson's Bay Company, the Swampy Cree had direct access to trade goods, including firearms, and were given the impetus to travel and trap as the demand for furs grew. The trading and armament privileges enjoyed by the Swampy Cree were used to their advantage by denying inland tribes direct access to the traders. With the advantage of armaments, the Swampy Cree could forcibly expand their territory in search of beaver with little resistance from less well armed tribes (Hlady, 1964:26) (Ray, 1974:14).

One could expect a number of snowshoe traits to be acquired by the Swampy Cree as they moved West and their extended frontiers brought them into contact with other tribes and a changing physical environment. However, their neighbours did not change for the following reasons. To the South, the Assiniboine, who had an alliance with the Swampy Cree (Innis, 1956:47), expanded their territory and moved West, the same expansionary direction as their Northern neighbours. The Chipewyans, Beavers, Blackfoot and Gros Ventres on the Swampy Cree's North Western, Western and South Western flanks respectively remained in their same relative positions as they were pushed back to the upper reaches of the Peace, Athabasca and Great Slave Lakes (Hlady, 1964:27). From these continuing relative positions, in spite of rapid migration and expansionary movements, the Swampy Cree maintained the same human contacts for the acquisition of traits. Similarly, the environment and materials available did not change from that encountered in their former ranges (Map 2). Hence the development of the Swampy Cree Snowshoe would likely be affected more by European contact and the introduction of large quantities of steel knives and European woodworking tools. European woodworking methods and ideas would also be introduced by the carpenters, coopers and workmen employed at the trading posts. However, since we have no records or surviving samples of snowshoe construction prior to European contact, we are not able to make this comparison.

The importance of the snowshoe to the Swampy Cree in their winter travels has already been mentioned in the Introduction, but it should be stressed that it was of equal importance to the European inhabitants and native retainers of the trading posts. Their dependence on the snowshoe for winter travel is illustrated by William Moor, wintering over at Montagu House in 1746-1747, who was writing to James Isham, Governor at York Factory, saying (Rich, 1949:292):

> P.S. Severall of our men are fallen into the Scurvy thro want of fresh provision, and 5 of our best men are harm'd by sprains, for want of snow shoes, you having Sent only 3 pr. for above 40 men.

The inclusion, at the Hudson's Bay Company directors' meetings, of such a detailed aspect of Trading Post life as


HUDSON BAY.
GREAT SLAVE LAKE
L. ATHABASCA
FORT SEVERN.
BIRCH SNOWSHOE FRAMES
DEER SKINS.
FORT ALBANY
MOOSE FORT.
LAKE WINNIPEG.
LAKE SUPERIOR.
ENVIRONMENT; WOOD RANGES.
CREE 1820
TREE LINE
BIRCH.
TAMARAK.
BIRCH or TAMARAK RANGES.
ISOTHERMS.
JAN. -16°F.
0°F.
JULY 48°F.
64°F.
RAINFALL.
NOV.-APRIL 5"
MAY.-OCT. 10"

Map 2. Environmental conditions impinging on, and woods available to the Swampy Cree. Exchange of hides and snowshoe frames between Trading Posts (Hlady,1964:27,33) (Fullard,1963:82,83) (Preston, 1961:44,148) (Grimm, 1967:25,101) (Wonders, 1969,44,45) snowshoes, illustrates the recognition of and importance given to these pieces of everyday winter equipment. One such record is to be found in the minutes of the May 17, 1680 directors' meeting by approving that (Rich, 1949:67, 68)

> Mar. Letton to Deliver 4 Dressed Mouse skins to Thos. Garland to make Snowe Shooes. Mar. Hayward to have a Moose Skinn for his Snowe shooes and Cololl. Meese the like for his.

Similarly, in the establishment of the Port Nelson Factory the directors approved a policy on May 16, 1682, by stating (Rich, 1949:8,219)

> whereas there is wanting for the new Factorey of Porte Nellson Snow Shews It is now ordered by this Committee that whoever the Members of the Company shall accomodate the said new Factorey with. any Snow Shews they shall be recompenced upon the returne of the ships from thence.

This policy in effect encouraged the Hudson's Bay Company employees to either construct their own snowshoes, bring snowshoes with them from other points of employment, or to have them made for themselves by the native population. In any of these three situations the Hudson's Bay Company was prepared to pay for their cost.

Chapter 3

THE PREPARATION AND USE OF HANDTOOLS

THE IMPORTANCE OF STEEL TOOLS

The Swampy Cree had access to metal prior to direct trading with the Hudson's Bay Company. They obtained it from the Ottawa Indians, living around the North of Lake Superior, who traded directly with the French (Blair, 1911: 173,174). The Ottawas travelled North from Lake Superior to the hinterland around the West side of James Bay and the Hudson's Bay where the Swampy Cree resided. The difficulty of transporting large volumes of pelts large distances and between different river basins reduced the trapping pressure on the beaver in this area, so ensuring an excellent dependable supply of beaver to the Swampy Cree. The beaver pelts were traded to the Ottawas, the middlemen, in exchange for their worn out tools and cooking implements.

The arrival of the Hudson's Bay Company representatives in Hudson's Bay in 1671 completely altered the availability of trade goods to the Swampy Cree in the immediate vicinity of the Bay. They now had direct access to a wide variety of new tools, guns and equipment, all of which gave them an advantage in trapping and controlling the beaver trade in the backwoods.

An examination of the York Factory account books of 1714 - 1720 indicates the type, volume and area in which the basic trade goods were distributed. It appears that 60 to 70 per cent of the total amounts of such items as kettles, knives, hatchets and guns went to the interior regions (Ray, 1974:85-87). Further indications of the huge trade can be judged from the fact that from 1720 to 1774 110,624 knives and 39,365 hatchets of all types were traded at or passed through York Factory (Ray, 1974:87).

The demand by the Swampy Cree for trade goods cannot only be judged by the sales volume and type of goods, but must also be looked at from the dependent necessity of using them to live. La Verendrye, while at Fort Charles in 1733, was petitioned by a young Cree representing seven villages (Burpee, 1927:146) saying:

> have pity on them and their families, that they were in a general condition of destitution, lacking knives, kettles, guns etc.

Innis indicates that this showed a loss of skills used in pre European contact times and a growing dependence on metal goods and guns (1956:14,15).

Within the general demand of all types of trade goods, certain specific items carried a higher trading value in "made beaver" than others when the Hudson's Bay Company came to trade. In their 1748 standard of trade, which equates the value of beaver pelts to trade goods, the Hudson's Bay Company were prepared to barter the following relevant articles used in snowshoe construction for one beaver pelt.

	Quantity Valued	Beaver
Awl blades	12	1
Large flat files	1	1
Knives	8	1
Hatchets	2	1
Mocotaugans	2	1
Scrapers	2	1

Table 1. Extract from 1748 Standard of Trade Showing the Quantity of Trade Items valued at one "Made Beaver" (Woodward, 1948:5)

A comparison between the articles indicates that the more highly manufactured products, such as the file, which would have no direct counterpart in the Swampy Cree tool inventory, fetched the high price of one beaver. The awl blades, on the other hand, were far easier to manufacture, cheaper to produce, but did have a counterpart in the Indian tool inventory (Honigman, 1956:27) and therefore traded at twelve for one beaver.

While the wide disparity in price between large, flat files and awls can be understood, the difference between other trade items in this list requires a more detailed examination. The mocotaugan, or canoe knife, which was considered of prime importance to the Indian population (Russel, 1967:216), traded at 2 to the "made beaver", compared with 8 knives to the "made beaver". The manufacturing processes and materials required to produce the blade of a canoe knife (it was sold without a handle), were certainly no more than that to produce a wide range of jack knives, French knives and rochberry knives. The latter were manufactured with such refinements as being sprung to stay open, had wooden or bone sheathing on the side, or had the inclusion of a safety lock to prevent accidental closing (Russel, 1967:170-225).

In a similar situation, only using manufacturing processes for comparison, we find that the hatchets and mocotaugans were both rated at 2 "made beaver". The two articles were on a par in "made beaver", yet when the labour used in the manufacturing processes are compared, we find that the canoe knife was easier to produce than the hatchet. The canoe knife was a plain piece of steel cut to size, we can assume, in a slitting mill (Gale, 1967:26) and finished by grinding and tempering. However, the hatchet required an infinitely higher degree of manufacture and skill where attention had to be paid to the correct forming and sloping of the eye and poll and where a far larger volume of metal was used (Russel, 1967:257).

A comparison of manufacturing prices reveals a large difference between knives and hatchets. Although the prices of the knives and hatchets are taken from the directors' meeting of the Hudson's Bay Company of December 6, 1683, and are of a period 65 years earlier than the "Standard of Trade" of 1748, the basic processes of steel and its manufacture had not changed (Gale, 1967:19-36). It is therefore assumed that neither the knives or hatchets were made in a different manner, likely to upset the cost of production. Both articles were made of the same type of steel, e.g. a steel with a high carbon content. The minutes of that meeting give the following prices (Rich, 1946:172):

		Equivalent prices in pence (d) for one of each
Large hatchetts	14d	14d
Small Ditto	10d	10d
Middle Ditto	12d	12d
Jack Knives	2½s p. Do	2½d
Rochbury Large	2s 8d p. Doz.	2 2/3d
Ditto Small	22d p. Do	2 1/5d
Long Knives large	2s 9d p. Do.	2 3/4d
Ditto Small	2s 1d p. Do.	2 1/12 d

Table 2. Cost of Hatchets and Knives, Read into the Minutes of the Hudson's Bay Company Minutes on December 6, 1683.

Unit prices worked out for comparison (Rich, 1946:172). The difference in cost between the hatchets and the knives becomes readily apparent when the equivalent prices are calculated for each article. The cost of a knife to the Hudson's Bay Company was one fifth to one sixth the cost of the middle sized hatchet. In summary, we find the cheaply produced canoe knives fetching the same price in made beaver as the more costly hatchet. This leads the writer to the conclusion that the canoe knife was an item much desired by the men of the Swampy Cree for its particular merits who were prepared to pay the extra price asked for it.

Another large difference between manufacturing costs of two articles which have the same trading price in "made beaver" can be shown when comparing the scraper, used in dehairing a hide, and our already described knives. The scraper was a flat piece of high carbon steel which had one edge bevelled and sharpened. In December of 1682 it could be supplied to the Hudson's Bay Company for 6 pence (Rich, 1946:53). This was little over twice the manufactured price for a regular knife, (Table 2) yet it would be traded for four times the amount of a knife according to the "made beaver" standard of trade of 1748 (Table 1). Once again the conclusion can be drawn that this item was coveted by Indian women who appreciated the efficiency and durability of the steel blade. It is assumed that this fact was known to the traders, who raised the price to what the market would bear.

An indication of the variety of tools which were used in a trading post can be seen from John Jacob Astor's Inventory of Tools, used at the Astoria trading post at the mouth of the Columbia river (Russel, 1967:403-407). Although this post was not in an area inhabited by Swampy Cree, it would nevertheless have had to maintain carpenters, blacksmiths etc. to provide a functioning Trading Post unit similar to those found throughout North America at that time. John Jacob Astor was an American Trader Trapper who, after a successful trading enterprise in the eastern United States of America, set out to extend his business in the Far West (Russel, 1967:8). He approached what is known as British Columbia and Alberta from the Columbia River, but was thwarted in 1813 by the North West Company who had come over the Rocky Mountains from the river drainage systems to the East.

The carpenters', boat builders', coopers' and blacksmiths' tools are all represented as well as a list of miscellaneous tools used to carry on such activities as canoe making, trapping and boating. Within the lists as a whole can be found the tools which were used by the European snowshoe builder as well as those used by the Native population. The Hudson's Bay Company lists tools of a wide variety in the 1684 Shipments outwards (Rich, 1946:291-313) and in the Outfit sent to the Athabasca Department in 1821 (Rich, 1938:142-168).

The present day Swampy Cree in Fox Lake still have access to the Hudson's Bay Company trading post. There are offered for sale a number of bevel edged chisels of varying widths, steel smoothing planes, sixteen ounce claw hammers, crosscut handsaws, beechwood mallets and an assortment of utility knives and screwdrivers. An electric hand drill, single speed with a one quarter inch chuck, and small table saw represent the power woodworking tools available in the community workshop at Fox Lake. A bench grinder with two grinding stones, one fine and the other coarse, represent the power tools associated with the working of metal.

MATERIALS USED IN TOOL CONSTRUCTION

The writer has observed that the type of tools used in constructing a snowshoe are related to the type of material they will form and work and also to the physical environment in which they are used. The two materials used in snowshoe construction are wood and rawhide. The prime characteristic differences between these two materials in their forming and working is that wood has to be cut and incised while the production of rawhide requires a scraping and abrading technique in its initial preparation and then cut into lacing. The second characteristic difference is that wood is a material which does not have free water or fluids associated with it. It therefore will not rust, to any great extent, the steel tools used on it. The unfleshed hide is often covered in blood and body fluids. This is washed off, but free water still clings to it and even after the hide is in the rawhide form, it has to be soaked in water to soften it before being cut into lacing.

These basic differences in cutting actions and physical environments, rule that steel tools should be almost exclusively related to wood, and bone used almost exclusively on hide. However, it cannot be said that the various snowshoe manufacturing processes absolutely and exclusively use a steel cutting tool or bone abraiding tool. The reason is that while steel tools have been used in the Swampy Cree area for over three hundred years, situations must be assumed to have arisen where they were not available or were not the best tool available for a particular process. For example a bone fleshing tool will remove flesh and fascia, but a steel tool could possibly cut the hide and would rust if not properly cared for. However, a steel scraper will quickly and efficiently remove the hair from a hide, compared with the laborious use of a bone beamer.

Honigman (1956:25) notes that in the pre contact and early contact period with Europeans the Swampy Cree relied on stone, bone, horn, animal tooth and wood to construct their cutting and other basic tools. He also notes that a rough division existed within these types of materials where stone tools were largely used by men and bone tools usually occurred in the labours of feminine tasks. Skinner (1911:33,52) also confirms that animal tooth and stone were used in the past, but steel was used at the time of his investigation (1908). It appeared that the ancient traits and skills did not entirely die out (Skinner, 1911:52) and the inventive and resourceful Swampy Cree Indian was capable of making any tool to fit the task at hand.

With the introduction of steel through the Ottawa Indian middlemen and direct trading with the Hudson's Bay Company, an entirely new material was introduced about which the Swampy Cree knew nothing initially. As time went on, it must be assumed that they mastered the skills necessary to work it and devised and adapted equipment associated with its working.

There were a variety of different steels used in the production of trade goods. Within the range of steels there lay the one with a carbon content suitable to give a piece of steel the toughness for a spring in a beaver trap or the hardness for a cutting edge of a canoe knife. Mild steel contains up to 0.25 per cent of carbon and is not easily welded when compared with wrought iron (Gale, 1967:14). A higher carbon content of over 0.25 per cent allows a hardening and tempering process to be carried out (Weygers, 1973:17), so that it will be tough and have strength to carry out its function. A carbon content of over 0.25 per cent but below 0.5 per cent is called medium carbon steel, while higher carbon steel runs from 0.5 per cent to 1.4 per cent. These are exact measurements, resulting from our increased mastery of technology and would not have been able to be measured until recent years. It was the even introduction of carbon throughout a mass of iron and the maintaining of this consistency which was the difficult thing to carry out for the sixteenth and seventeenth century steel producers.

Wrought iron (Fisher, 1963:16) was the basic material from which steel could be produced and was made by smelting or reducing the oxide of iron into its almost pure form in a bloomery or open hearth. This low carbon mass of iron was extremely malleable under the relatively low heat of 2196°. The material is soft when cold and cannot take an edge for cutting. However, a thin, hard skin, containing a higher percentage of carbon, can be formed on the object in the following manner. The object was shaped to the required tool and heated to 900°C (Schubert, 1957:322) and then immersed in a box of finely ground carbon or charcoal. The carbonaceous material is taken into the surface of the steel which consequently becomes hard. This method is called "case hardening".

Another method of hardening the iron was to allow it to stay in the bloomery for a longer period of time. It was placed away from the oxidising blast of air used to burn the charcoal, but closer to other charcoal material from which it absorbs carbon (Schubert, 1957:322). The taking in of carbon into its surface once again made it hard.

In 1686 (Schubert, 1957:327) a prototype of the cementation furnace, to be used extensively in the future, was operating in Bromley, Staffordshire. This method produced steel with a higher carbon content than wrought iron. Wrought iron was placed in layers in refractory chests between coverings of carbonaceous matter and the chests sealed tight (Schubert, 1957:328). It was fired from 3 to 7 days, during which time, in the absence of air, it absorbed the carbon. The higher carbon content bars were then taken out and consolidated together by a power hammer. This type of steel had characteristic blisters all over its surface from whence it derives its name, blister steel. The steel produced by this method was harder on the surface than inside and was uneven in its composition due to the layers of slag included in the wrought iron (Schubers, 1957:330). It could not, therefore, be used for articles requiring a consistent quality of steel, e.g. springs in animal traps.

An improvement on the blister steel was the method used to make German steel (Schubert, 1957:329). Four or six bars of blister steel were bound together into "Faggots". They were covered with sand to prevent oxidation and heated to the full welding heat of 1400°C. The bars were then welded together into a square bar so distributing the higher carbon steel throughout the mass. This could be repeated 5 different times to produce five increasingly better grades of steel.

A trading post blacksmith would have access to at least five different types of iron and steel. The 1820 - 1821 Athabasca Outfit (Rich, 1938:152,154,160) lists 2½ inch and 1½ inch iron bar, iron rod, German steel, Blister steel and a quantity of steel designated as yards and quantified in pieces. It is assumed that this latter type of steel could mean a lower grade of steel made by allowing it to stay in a non oxidising flame of the bloomery and carbonising when in contact with charcoal (Schubert, 1957: 322). The writer assumes that the 2½ inch and 1½ inch iron bar was probably of a low carbon content and therefore wrought iron. The specific widths indicate it was probably a product of the rollers in a slitting mill (Schubert, 1957:308,309). The iron rod can be assumed to refer to wrought iron once again and represents a product from the slitting rolls of the slitting mill (Gale, 1967:26).

A material necessary for the tempering (Weygers, 1973:18,19) of small tools is salt. This is mixed up into a strong saturated solution and would be held close at hand to the forge. A number of salt sources were available to the trading companies and these were generally visited while canoes were travelling en route to another destination. George Simpson, while at Fort Wedderburn (Fort Chipewyan), wrote a letter to John Lee Lewis of Lesser Slave Lake in which he promises him a keg of salt if the Great Slave Lake brigade touches at the salt springs (Rich, 1938:283).

The total weight of iron and steel moved into the Athabasca area in the 1820-1821 outfit was close to half a ton. This enormous weight could easily be accommodated in the boats which were used on the wide rivers on the Hudson Bay and Athabasca drainage systems (Innis, 1956: 161-163).

The material available to the Swampy Cree to make tools would come from worn out steel trade items. John Franklin notes in his reports of October 6th, 1820, that

Indian or Canadian voyageurs made the crooked knife out of an old file (Franklin, 1969:240).

The Quality of Steel Trade Goods

The quality of trade goods was an important factor in the trading of animal skins and pelts. James Bird, Factor at the Hudson's Bay Company post of Carlton House in 1796-1797 thought that the North West Company traders' better quality goods would unduly influence the Indians to trading beaver with them (Ray, 1974:143). This appreciation of the fine points of materials by the Swampy Cree showed a degree of sophistication and an ability to exert leverage to gain what they wanted. The factor which appears to be the most critical is that of the quality of steel in the trade hand tools.

Governor Simpson, while residing at Athabasca Lake, wrote on May 18, 1821 (Rich, 1938:408):

> The axes (marked Foster) are also of the worst materials and badly tempered, they should be manufactured of the best Swedish Iron and German Steel and tempered with great care; those we had this season were as brittle as Glass during the severity of the Winter: the maker should be informed that they are most required when the Thermometer is about 50 degrees below zero: it is scarcely possible to describe the misery we have this Season suffered from the bad quality of the axes, frequently unable to provideFire Wood, and were it not for those bought and Stolen from our opponents Servants our sufferings must have bene very great... Our Iron Work is the most important article of Trade in this Country, the utmost care and attention should therefore be paid to have it of good quality.

Evidence of the poor quality steel and workmanship can be judged by the volume of knives, swords and scrapers returned from Hudson's Bay on the Ship Diligence in 1682 (Rich, 1946:53n). A total of 16,005 steel objects ranging from one penny scrapers to guns valued at one pound sterling were included in this list of a wide range of trade goods. The value of the returned steel goods, according to the ledgers, totalled close to 300 pounds.

Reference is made by Thomas McCliesh (Rich, 1938: 137), factor at York Fort, in a letter dated August 8, 1728, to the poor quality of the iron which was issued to them with which to make tools for trade. He says "be pleased to send us good iron, our smith could not make the ice chisels and scrapers last year without cracks and flaws. At the same time he is known to be a good workman." The cracks and flaws can be assumed to be the excessive amount of slag and silicates remaining in the steel in spite of processing in England (Schubert, 1957: 330). Another factor could be that the low grade ores commonly used for steel production contained an unacceptable level of phosphorous. This caused weakness and brittleness (Schubert, 1957:322).

There was apparently a double standard maintained in steel goods between the Indians and the Hudson's Bay Company traders (Rich, 1942:25n). This double standard manifested itself early on in the Hudson's Bay Company trade with the Indians (Rich, 1942:24,25) for the February

8, 1672, minutes state:

> That Mr. Millington bee desired to take care for provideing one thousand biscay hatchets one halfe of three pounds and one halfe of two poundes a piece, to bee Sure that they bee such as are for trade with the indians and not such as are for the inhabitants of Canada.

It appears that this double standard had ceased to exist at the time of George Simpson, for in 1821, (Rich, 1938:408) he acknowledges that "trade items of iron were most important and should therefore be of good quality.

CONSTRUCTION AND USE OF HANDTOOLS

Blacksmiths and Tool Construction at the Trading Posts

The trading posts usually had a blacksmith on their complement who was an important tradesman. Simpson (1938: 136,137) states in a letter to Governor Williams on 30 November, 1820, that at Fort Wedderbume (later called Fort Chipewyan)

> Cluston the Blacksmith who is really a valuable man, I believe returns to the low Country in Spring, he will be a great loss to us, it is therefore absolutely necessary that a man is sent in to fill his place next season; a Blacksmith is also required for St. Marys and I trust you will be able to provide both.

A well trained blacksmith would have had little trouble in working with any of the iron and steel work generally found in a trading post. The Blister and German steel could have been used for the manufacture of knives and axes and the 2½ inch and 1½ inch wide bar used for such articles as scrapers. Hanson states that it would have taken but little time for the trading post to cut off a section of either the 2½ inch or 1½ inch wide bar, file it down to a 45^{o} angle and sell as a ready made scraper (1970:7,8).

An apprenticed and qualified blacksmith in every post would have been ideal but not a necessity. George McKay "B", to distinguish him from George McKay "A", was initially employed as a labourer in 1818, but in 1830 he was employed at Fort Chimo as a blacksmith. Nicol Finlayson's Journal from 1830 - 1833 records that on March 25th, 1931, McKay was making crooked knives in the forge (Davies, 1963:137). Finlayson (Davies, 1963:117n) later commented that McKay was "no tradesman, but can make himself generally useful", which indicates that a variety of jobs and tasks could be expected to be performed by an employee of the Hudson's Bay Company.

A blacksmith employed in any of the trading posts around Hudson's Bay could be fully employed year round. Russel (1967:358) states that these trading posts were engaged in a large scale manufacturing business, turning out a volume of steel goods. The writer assumes that the location of the posts with direct access to water allowed the comparatively easy transportation of the heavy steel and iron bars from the outward bound ships from England.

Tools Used by the Men

Wedges. The two tools used most extensively in cutting down birch and splitting it to shape were the wedge and axe. (Fig. 1).

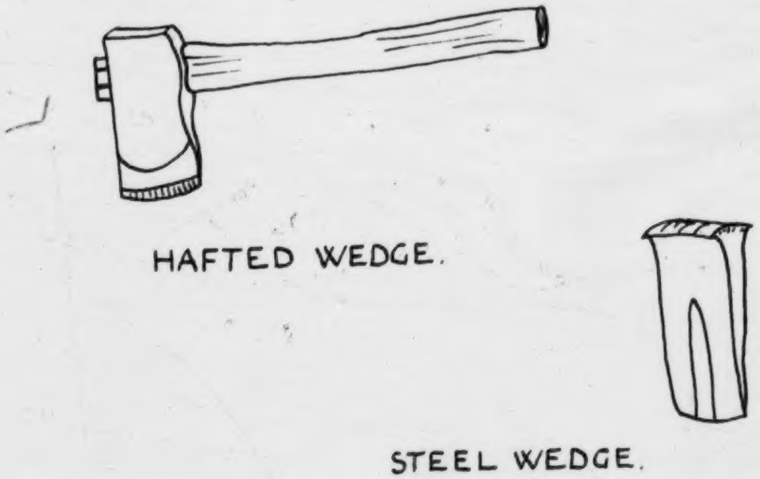
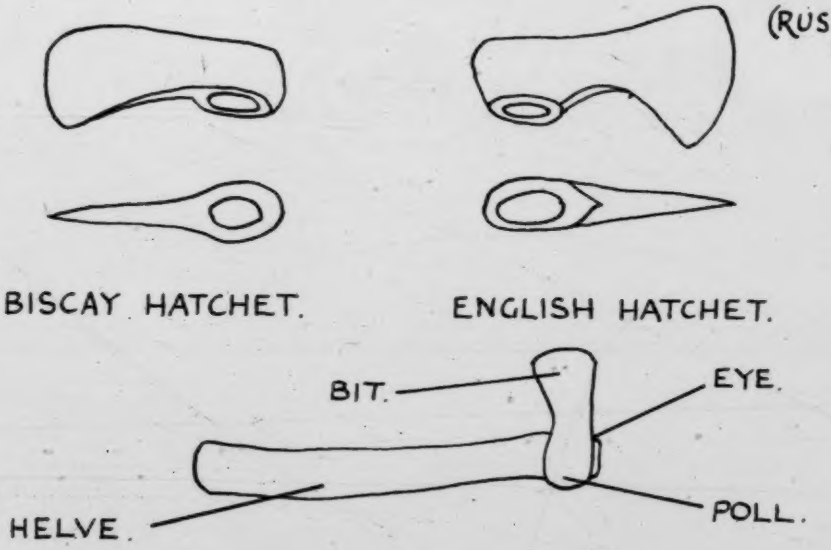

HAFTED WEDGE.
STEEL WEDGE.

Figure 1. Steel Wedge and Hafted Wedge Used in Splitting Wood for Snowshoe Frames

Robert Longmoor (Rich, 1952:170), Factor at Hudson's House in 1780, states that "the carpenter and two men are away in the woods falling and splitting snow shoe frames". A steel wedge is noted as being in John Astor's Inventory of tools (Russel, 1967:403) and would have been available to the inhabitants of the trading posts. It could have taken the form of a simple steel wedge or could have been the specialised tools used specifically for splitting wood quickly and efficiently. These specialised tools were known as a beetle and wedge (Jenkins, 1966:16, Fig. 2).

The wedge was somewhat larger and wider than the ordinary steel wedge, for it had a haft attached to it through the eye. Honigman (1956:27) states that the Swampy Cree would have used wooden wedges if they were working for themselves (Honigman, 1956:27). The writer observed the Swampy Cree of Fox Lake using to advantage the wedge shaped characteristics of an axe head as well as steel wedges.

Axes. The Swampy Cree had access to iron axes of French design, through the middleman of the Sioux, Ottawa and Saultau Indians, prior to extensive trading with the Hudson's Bay Company (Innis, 1956:47). The designs of axes traded by the Hudson's Bay Company appeared not to have altered to any great extent from the French design because the newly-formed Company relied heavily on French experience when they purchased trading goods (Fig. 2).



(RUSSEL, 1967:249)

Figure 2. Axes Used in Cutting Wood in the Swampy Cree Area.

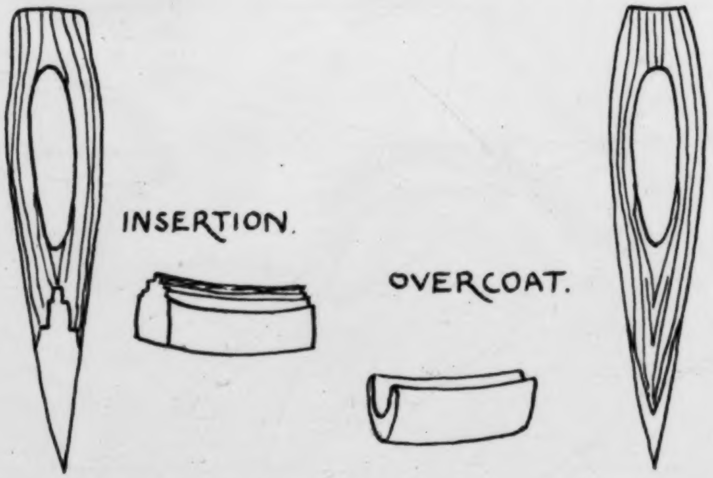
They go on record at the Directors'meeting of November 23, 1673, stating (Rich, 1942:58,59)

> That Mr. Raddison attende Mr. Millington forthwith with a patterne of biscay hatchetts to bee provided for this Company, Such as are usually sent from thence for France to Serve the indians in and about Canada, and that Mr. Millington bee desired to give order for two thousand hatchetts to bee brought from Biscay by the first oportunity, and that Mr. Kirke bee desired to treate for providing Such french goodes as may be necessary, and give reporte thereof to the committee.

A number of different sized hatchets were traded by the Hudson's Bay Company. The minutes of the directors' meeting held on January 16, 1672, indicate that (Rich, 1942:201) "Mr. Millington bee desired to give Commission for 1000 biskay hatchets for a cargo for the next voyage." Five hundred of these were to be of 3 pounds weight and five hundred at 2 pounds (Rich, 1942:24). Other weights of axes, namely 1½ and 1¼ pounds are mentioned (Rich, 1942:61). A sketch made in June 1847 by Fort Yukon's first chief Factor, Arther Murray, of Mannuel, his assistant, clearly shows him wearing in his belt a lightweight axe, possibly of 1¼ - 1½ lbs (Wilson, 1947:39). Directions were given on March 24, 1674, for the purchase of 200 hatchets with square heads for trial use (Rich, 1942:91) from which can be assumed that experimentation in design or the introduction of a known English design was to be made to the existing trading good inventory.

The Fox Lake Cree use a long handled axe defined by Goodman as an American Wedge Axe (1964:36).

The problem of axes which shattered in the cold or did not hold their edge (Rich, 1938:408) was finally solved after 1824 by inserting small steel wedges into the cutting edge of the axe bit and welding it into the iron head (Woodward, 1976:12). Two methods of fastening were used (Russel, 1967:259) (Fig. 3). One was called the overcoating steeling method, where a folded piece of steel was wrapped around the bit, or cutting end of the axe.



(RUSSEL,1967:259)

Figure 3. The Overcoating and Insertion Methods of Steeling Axes

The best method was the insert steeling method because the steel insert was larger and permitted repeated grinding without loss of the cutting edge.

Beetles, Mauls. A tool must have been used to drive the wedge into the wood. Honigman (1956:27) states that a simple tree limb was used in the place of a maul and was called in Cree, a hammer. A specialised British tool was the beetle. (Fig. 4).

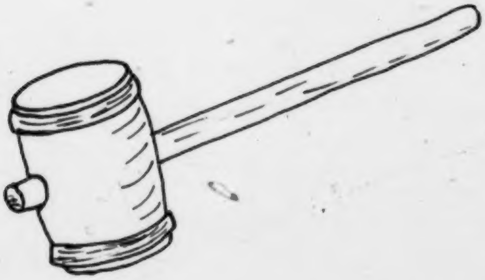


Figure 4. A Beetle Used in Driving a Wedge into Wood to Split it

It was a large wooden block, about 6-8 inches in diameter and 10 to 12 inches long, which had steel hoops shrunk onto the end to prevent splitting. A long handle allowed a workman to swing it to gain driving power (Jenkins, 1966: 16, Fig. 2), (Rich, 1946:306). Since a fairly flat surface was needed on the object which did the striking, a small hand axe with a round poll, as shown by Wilson (1947: 39), could have been difficult to use. However, the square headed hatchet as described in the Hudson's Bay Minutes of March 24, 1674 (Rich, 1942:91) would have made a useful alternative for a hammer. The Swampy Cree of Fox Lake, when driving their wedges, use the flat poll of a long handled axe.

Canoe Knife. The Canoe Knife, or mocotaugan in the Cree language, was an essential tool in Indian society and "constitutes one of the unique 'living' artifacts representative of persisting ancient traits and techniques" (Russel, 1967:230) (Fig. 5). The canoe knife was used for thinning down the snowshoe frames to the requisite varying cross sections.

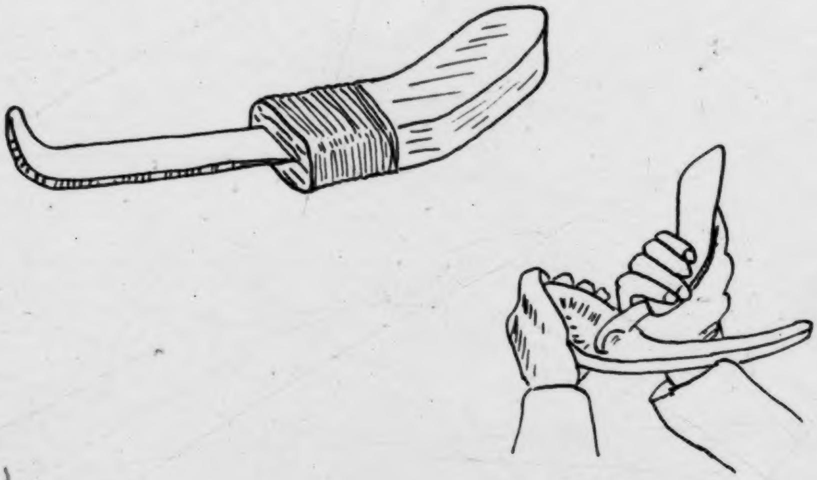


Figure 5. The Canoe Knife and How it is Used

Clarke (1976:1) indicates that tools made with laterally orientated blades existed prehistorically in northern North America. The direct origin of the steel canoe knife appears to have been from a tool made from the upper front beaver teeth and jaw. Skinner (1911:51,52) states it was removed from the main skull and could either be held in the hand or mounted on a wooden handle when being used. It is also interesting to note that a tool similar to the crooked knife was used by the Welsh for making spoons and hollowing out bowls (Jenkins, 1966:61). It was called a twca cwm and had exactly the same function as the crooked knife. The writer suggests that the English saw the native design and observed that it could be improved upon, or that they noted that the twca cwm appeared to be a useful object for trade with the natives.

The steel canoe knives coming from England were packed in barrels, along with other assorted hardware. It came without a handle, which was made by the individual Swampy Cree (Rousseau, 1949:36). The flat 7 inch blade with a ground bevel on the upper edge facing you, had the tip turned up on a 1½ inch radiused curve. The blade was 3/4 inch wide. A dog-legged handle extended from the handle, so the butt end pointed away from you.

The method of using the knife with one hand is by holding it palm up and pulling it towards yourself. The thumb takes on the angle of the crooked section of the handle (Rousseau, 1949:36). This action of drawing towards yourself, utilizes the stronger biceps muscles as opposed to the weaker triceps of the upper arm, which is used when whittling away from yourself with a straight bladed woman's knife. On occasions when a great deal of heavy cutting is required on a stable, firmly held object, two hands are spread out on the handle and the same pulling motion is performed (Rue, 1961:30-31).

John Franklin, on his first Arctic expedition in 1820, described in his reports the ability of the Indians to work with the canoe knife (Franklin, 1969:240):

> Our working party, who had shown such skill as house carpenters, soon proved themselves to be, with the same tools, the hatchet and crooked knife, excellent cabinet makers, and daily added a table, chair, or bedstead, to the comforts of our establishment. The crooked knife, generally made of an old file, bent and tempered by heat, serves an Indian or Canadian voyager for plane, chisel, and auger. With it the snowshoe and canoe timbers are fashioned, the deals of their sledges reduced to the requisite thinness and polish, and their wooden bowls and spoons hollowed out.

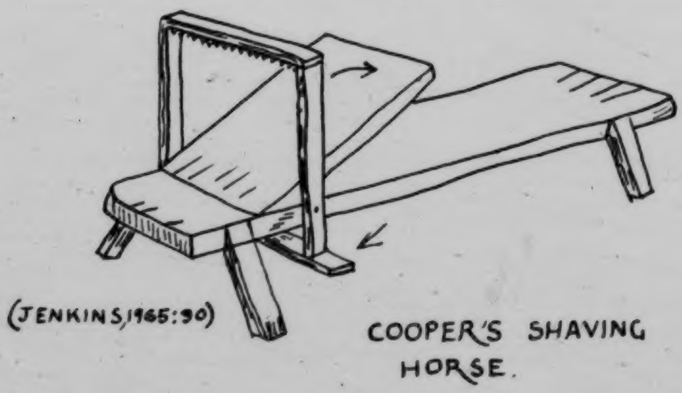
The equivalent tool in the European tool collection at this time was the drawknife (Jenkins, 1966:13, Fig. 1) (Rich, 1946:305) which was a steel blade 12 or more inches long with handles driven onto long tangs. The tangs were rivetted over a steel washer and projected at right angles towards the user and in the same plane as the blade. A ground bevel was on the upper edge closest to the individual using the draw knife (Jenkins, 1966:12, photo 7).

The blade of the canoe knife was either made in England, at the trading posts, or by the Indians themselves. The writer observed a Swampy Cree Indian manufacture a canoe knife at the Fox Lake reserve. The writer asked a young Indian to construct a canoe knife with a 10 inch file he had in his possession. The Indian ground off all the file marks and thinned down the bevelled edge. A tang, 3/4 inch long, was ground on the right hand end of the bevel as it faced you. The file was then placed in a wood fire made from birch and spruce till it was heated to a cherry red, the colour did not appear to matter as long as it was glowing. The upturn curve was then hammered into it comparatively easily.

The wooden handle was made by the canoe knife owner. An appropriately shaped piece of wood was obtained for the handle. On the end opposite the curve extended a tang of 2 to 3 inches and 3/16 to ¼ inch wide, the last ¼ inch of which was bent in the opposite direction in the blade curve. The tang and the first 1 inch of the blade were recessed into the dog-legged handle and the whole bound tightly with brass wire or rawhide (Skinner, 1911:52). If wire was used, it was often held in place when starting and finishing by the drilling of a hole in the handle, the insertion of the wire, and the driving into the hole of a small wooden peg. In many samples the writer has seen, the wire was made of brass which was snare wire used for trapping small fur bearing animals and feature in the Athabasca outfit of 1821-1822 (Rich, 1938:164). Honigman (1956:26) states that knives were used by cutting towards and away from the body. This indicates that a crooked knife with characteristic draw knife movement was being used. The beaver teeth had to be fastened to a handle in some fashion. It must be assumed that it was tied with rawhide lacing. The Ingalik (Osgood, 1940:87) of Alaska cut a slot in a piece of spruce wood through which the teeth projected and were bound tightly with rawhide. This type of tool was held in an overhand grasp, not an underhand grasp, because the teeth were set at right angles to the straight handle which did not allow the drawknife technique as the thumb could not bend back far enough. In a sample the writer has examined (National Museum of Man, 1899:VI-Z-139), collected from the Great Slave Lake area, at the Western end of the Swampy Cree Range, it is noted that the teeth were still contained in the upper jaw and the whole mounted obliquely on a spruce handle so that the underhand grasp could be used.

Holding devices. To effectively use a drawknife the material being worked on had to be held firmly while the blade was drawn over the wood to be used. It must be assumed that this was achieved with the aid of a shaving horse (Fig. 6) which would be well known to labourers and craftsmen alike in the employ of the Hudson's Bay Company for it was used by a large number of British craftsmen, including the chair bodger, hoopmaker, spale basket maker, trug maker and cooper, etc. (Jenkins, 1966:16,29,49,52, 86).

Goodman (1964:185) shows a drawing of a European joiner's bench of 1676 which has no side vice with which to hold wood. However, it has a series of holes in the top surface into which a holdfast could be put. A holdfast was a steel clamp which held wood to the bench top. This could have been used to hold a snowshoe frame adequately if the bench and holdfast were available at a trading post. The side vice on a bench did not appear until after 1800, according to Goodman (1964:186), and the writer feels it would only have been of use in holding timber while it was being sawn to rough shape for the snowshoe frames and crossbars. If the side vice were used to hold the compound curved snowshoe frame while a mortice was being cut, then repeated blows by a mallet to a mortice chisel would have driven the frame downwards. It would then become inaccessible and have to be raised from between the vice jaw and bench. A solid firm support underneath the frame is needed when cutting mortices.



Figures 6. The Shaving Horse Used to Hold Snowshoe Frames while they are Being Cut to Size

Another tool used for holding the frame would be a hand-vice (Rich, 1946:292) which was used to fasten material to the bench while it was being worked. It would be especially useful in holding down material which was curved, such as a snowshoe frame.

The Swampy Cree Indians have no vice or shaving horse but use their free hand to hold down their material. The Fox Lake Cree hold down the snowshoe frame with their spare hand or kneel on it on the floor.

Planes. The 1684 shipment outwards lists a variety of planes (Rich, 1946:292). The planes which relate to snowshoe construction were the jack plane and the smoothing plane. They both take the form of a hard wood block with the iron or double iron being held in a slot with a wooden wedge (Goodman, 1964:70,78). The iron projected out of the plane at an angle and cut the wood when pushed firmly over the wood surface (Fig. 7).

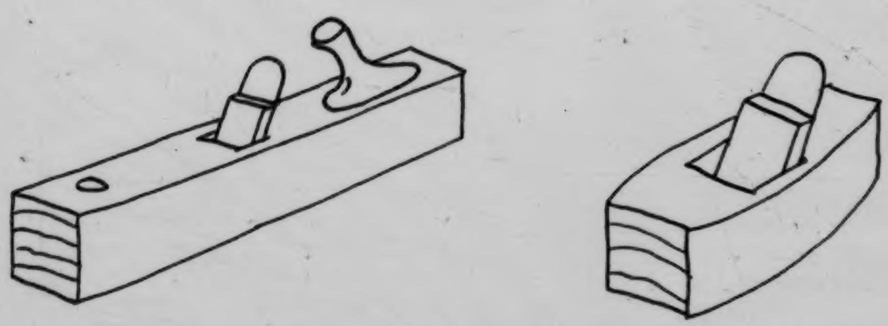
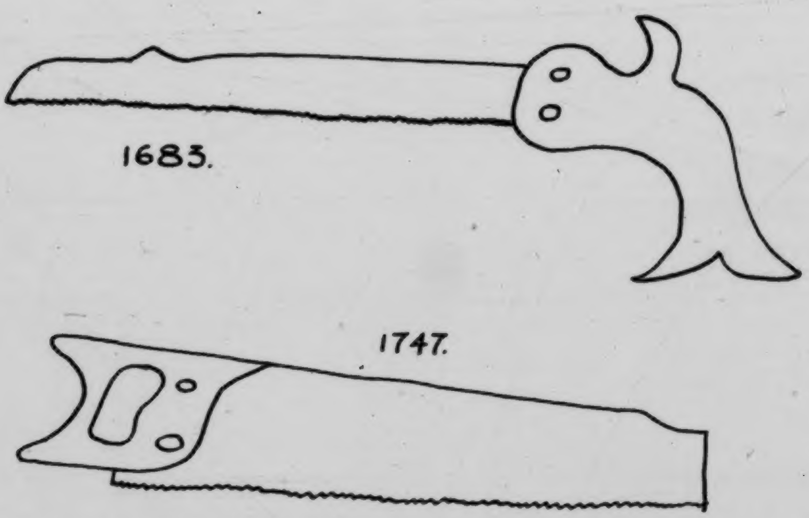


Figure 7. Jack Plane and Smoothing Plane Used in Shaping the Frame

In snowshoe construction the writer assumes they could have been used to cut the frame blanks to size and cut the tapers. The 15 inch long jack plane would quickly remove the excess wood and the smaller 9 inch smoothing plane would flatten out and finish the surfaces. These sizes are approximate, and the writer gives them to illustrate their size and size differences.

The Fox Lake Cree use a contemporary smoothing plane with a cast iron body and a double iron and cap. The cap replaces the function of the wooden wedge in holding the iron in place. This lightweight tool is held in one hand and is used exclusively to obtain the requisite taper to the frame.

Handsaws. Frequent mention is made of handsaws in the 1684 shipment outwards, but of particular interest in snowshoe construction would be the cross cut saw (Rich, 1946:306). The term cross cut refers to the fact it can cut across the grain of the wood as well as down it. The saw would be used to cut to length the frame and crossbars. It cold also be used for cutting the crossbars to width and thickness. Illustrations of it appear in Goodman (1964:69,149) (Fig. 8). The first illustration shows a page from Joseph Moxons, 1683, "Mechanick Exercises" and the second is a photograph of the footstone to the grave of Mark Sharp, 1747. These illustrations show the rapid development of the saw at that time to a design close to contemporary styles.



(GOODMAN,1964:69,149)

Figure 8. Handsaws from 1683 and 1747
Showing the Development to Contemporary Designs

The handsaws would be made in or near Sheffield, the centre of the tool trade at that time (Goodman, 1964: 147), but the writer assumes that they would not be made at the trading posts for the degree of difficulty in construction they would present. The Swampy Cree were unlikely to have a saw in their personal tool kit, for it is a bulky object. The equivalent tool would have been their handaxe as John Franklin notes on October 6, 1820 while on his first Arctic Expedition (1969:240).

Awl and brace and bit. The square edged, four sided awl had the prime function of piercing the wood frame and crossbars through which to pass the selvage thongs (Fig. 9). These simple tools could be used in many ways to obtain round or slotted holes. The first awls introduced into North America were the same type used by European shoemakers.

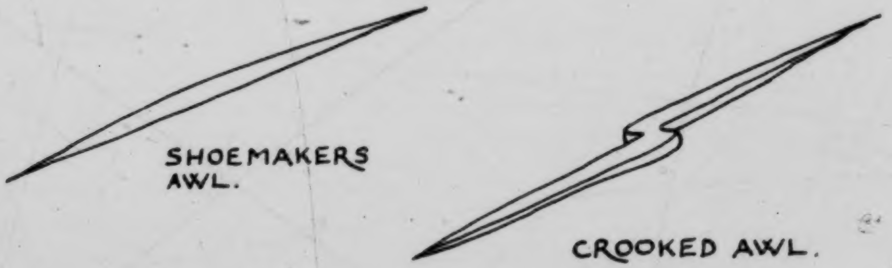


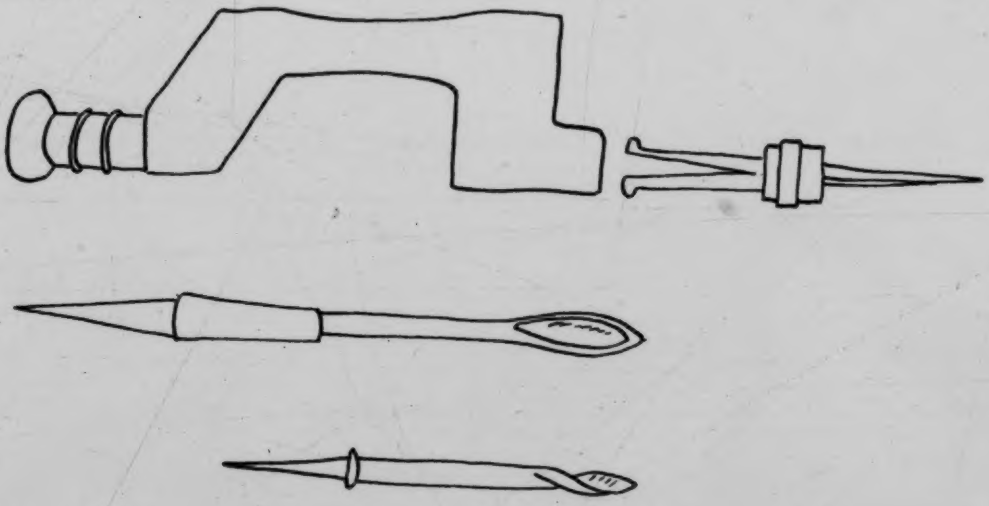
Figure 9. The Shoemaker's Awl and Crooked Awl

They had a straight square edged shaft and were recommended by Baron Lahontan in his reports in the 1680's (Thwaites, 1905:377) as being one "of the Goods that are proper for the savages" and they would be accepted by the Indians in exchange for furs. Engages (1971:2) notes that these straight shafted shoemaker's awls had a dangerous feature of splitting the handle into which they were thrust and so piercing the user's hand. The safety feature of having the blades offset in the middle is noted at the January 25, 1682 meeting of the Hudson's Bay directors who (Rich, 1945: 177)

> ordered that Rich. Mauhlin make ready 1250
> Aules according to the Samples now shewen
> this Committee and are thus to be sorted
> 500 of the large crooked steel blades
> 250 of the small Ditto
> 250 of the large straight bladed
> 250 of the small Ditto
> ——
> 1250 For which they have agreed with him
> —— for 12dp dozen.

They were used by sticking them into a handle of wood. The point was then pushed into the wood to be drilled and rotated. The square corners wore away the wood which crumbled out. Continuous use of this tool requires a strong wrist.

Use of a brace and bit by the inhabitants of the trading posts was a certainty for Goodman (1964:175) notes they were a well developed tool by 1500 and the 1684 shipment outwards lists 6 drills and 1 drill box (Rich, 1946: 304). What type of drill bits these were is not known, but they could have taken the shape of spoon bits or twist bits, both of which would be capable of drilling holes for the selvage thong of the snowshoe frames(Goodman, 1964: 174, fig. 177) (Fig. 10). Goodman shows a photograph of what appears to be a four sided bit similar to the Indian Awl (Goodman, 1964:176, fig. 179). The material in the photograph originates from Stockholm, Sweden, but this type of drill bit could have been in use by the English for a similar type was used by the shoemakers. The writer feels that the simplicity of the design and the ease with which it could be manufactured, would have made it a part of the woodworkers tool kit. The writer feels it is unlikely that the brace would have been made at the trading post, especially after 1800, for by this time they had become a technical and complicated tool for the blacksmith to forge.



(GOODMAN, 1964: 176, FIG 179:
174, FIG 177.)

Figure 10. Brace and Bits in Use
After 1505

Skinner (1911:44) notes that chisels of beaver teeth were once used in perforating the snowshoe frames. He also states (1911:52) that the chisels had wooden handles. Honigman (1956:27) refers to the incisor tooth of a beaver being used for a drill and for comparison indicates that it closely resembles the Ingalik beaver tooth chisel. It can be assumed from the above references that the Swampy Cree could either drill or chisel wood with the same tool and it was called either a drill or chisel, depending on what it was going to be used for at that time. (See tool section headed "Chisel" for details).

At the present time the Fox Lake Cree use an electric hand drill to drill the holes for the selvage thongs. The drill bit is 3/32 inches in diameter, sufficient to allow the dry selvage thong to pass through easily.

Chisel. A chisel was used for cutting a mortice in the snowshoe frame to take the crossbar tenon. A large variety of chisels were in use in the Hudson's Bay Company Posts, all of which could successfully be used in cutting a mortice, although they were each designed for a specific purpose (Fig. 11).

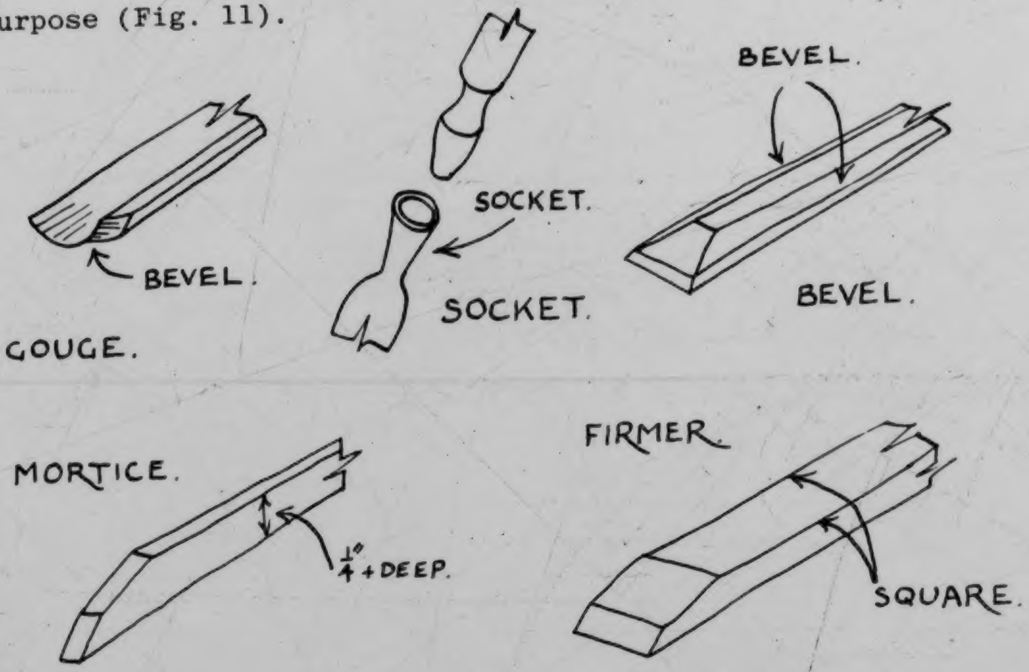


Figure 11. Chisel Types Used in the Trading Posts

The following list of chisels taken from the Hudson's Bay Company list of Shipments Outwards from London in 1684 gives the wide range of chisels available (Rich, 1946: 291, 292):

> 6 inch chissells, 6 halfe inch chissells, two fermers,
> 6 quarter inch chissells, 6 gouges, two fermers,
> 6 pareing chissells, ...

John Astor's "Inventory of tools" (Russel, 1967:404-405) lists under the heading of "Boat Builders Tools in Use.... 1 Bevil, 4 Firmers chisels, 4 Socket chisels." Under the heading of Small Tools and Miscellaneous Iron Implements he lists "8 Chisels for Indians, 13 Morticing chisels, used, 23 Firmers Chisels, used." We are not given a description of the chisels for Indians, but they must have been substantially different in design or quality or come without handles for firmer chisels cost 20¢, socket chisels 31¢, and morticing chisels 33 1/3¢ against the much lower 12¢ for the Indian chisel.

The steel chisel was either made in England, at the trading post, or by the Swampy Cree. In the latter case it can be assumed that the Swampy Cree had enough experience in working metal with hand tools to manufacture a functioning tool just as they had the capability to construct a crooked knife.

According to Goodman the English chisel blade designs as shown in Fig. 11 have not changed a great deal from Roman times, but he gives no exact date (1965:196).

The functions of these tools has not changed from at least before 1632, for Joy (1962:18) notes that joiners used mortices and tenons, frames and dovetail joints in cabinet construction. The construction of these joints would have required the use of chisels as previously described and which would be in widespread use in Europe.

Skinner (1911:52) says chisels of beaver teeth were used in the old days and that they had wooden handles.

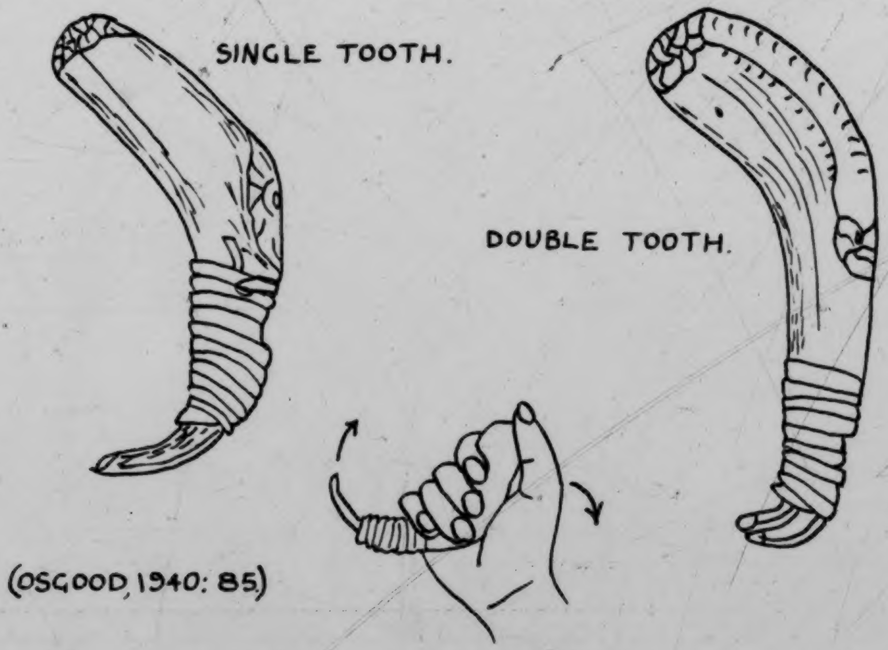

SINGLE TOOTH.
DOUBLE TOOTH.
(OSGOOD, 1940: 85)

Figure 12. The Swampy Cree Beaver Tooth Wood Chisels

The Swampy Cree beaver tooth wood chisel, which, according to Honigman (1956:27), closely resembles those made by the Ingaliks (Osgood, 1940:85), could take two forms. The first chisel type is made from the single lower incisor tooth and the second made from the two upper beaver incisor teeth (Fig. 12).

The beaver tooth chisel had a dog-legged wooden handle which was taken from the junction of a spruce tree branch. The branch was scraped with beaver tooth chisels into the correct shape and a recess cut into the lower convex end to take the beaver teeth. The teeth, according to Osgood (1940:86), must be extracted from the beaver skull immediately it has boiled as they are at this time easy to remove. Honigman (1956:27) states that boiling the beaver skull makes the incisors brittle. The teeth were smeared with spruce gum, inserted in the recess of the handle, and bound tightly with rawhide.

Osgood states that both of the two chisels are held firmly in the hand, so the tooth or teeth are pointing away from the workman. The thumb is placed firmly in the groove on the side facing you and the wrist cocked downwards. By bringing the closed fist upwards the teeth scribe an arc. The corner of the beaver tooth is the part which does most of the cutting.

The Fox Lake Cree use a one quarter inch mortice chisel exclusively for the cutting of mortices.

Tools Used by the Women

Women worked almost exclusively on the green hides to produce rawhide (Honigman, 1956:25). Most of their tools were made from bone and wood, but steel was used in some situations because of its efficiency.

Woman's knife. The woman's knife was made out of steel with a handle of whatever material was available, either wood or bone. The blade was straight (Hanson, 1975:5) and sharpened on one side (Fig. 13). The Fox Lake Cree use it for the cutting of slits around the green hide preparatory to stringing it on a frame. It is also used to cut off surplus chunks of meat or fat. When the hide has been processed to the state of being rawhide, the writer noted that the Swampy Cree women cut it out of the frame with the woman's knife.

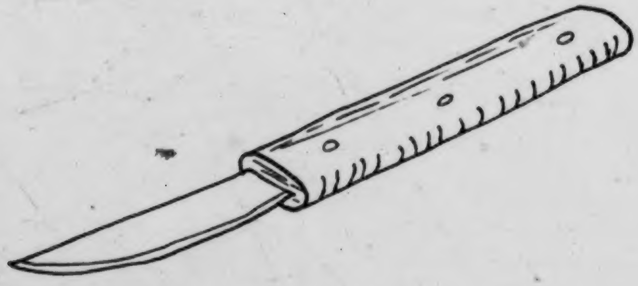


Figure 13. The Woman's Knife

It can once again be assumed that this tool could be constructed by the Swampy Crees from steel materials available to them. The ready made article was available at the trading posts in large volumes and comparatively cheaply (Rich, 1938:154,155). Honigman (1956:26) states that bone knives were made from the ribs of a caribou, moose or bear. Curtis (1907:67) and Skinner (1911:52) indicate that knives were also made of stones. No information is given as to how these were formed.

Flesher. The flesher was a tool which removed the flesh, fat and fascia from the inside of the hide. It appears to be one of the few tools which have not changed through the centuries. Honigman (1956:26) states that it was made from the lower fore limb of the caribou. Curtis (1907:68) states that the lower leg of a moose was used and Skinner (1911:;25) and Mason (1889:567) report that either the caribou, reindeer or moose could be used (Fig. 14). The lower foreleg of these animals are especially suited to the specific use it is put, because the bones are solid and have a flat side to give an efficient scraping edge. The sharply bevelled working edge has a number of nicks in it which makes it a better tool than if it had a smooth edge (Skinner, 1911:125). The nicks keep the tool directed downwards when in contact with the hide and prevent it from slipping sideways, and therefore increases its efficiency (Losey, 1971:4). A looped handle was passed through the ligamentous tissue which was left on what would be the back of the leg bone. The tendons were originally passing through this loop (Losey, 1971:4, Fig. 3a). The loop was of sufficient length so the forearm could be passed through it and the bone gripped about two thirds of the way down (Curtis, 1907:68). The bevelled edge faced the user with the scraping edge being furthest away. It was used by gripping it firmly, lifting it above the head and driving it down onto the wet hide. The bone edge was not sufficiently sharp to damage the hide.

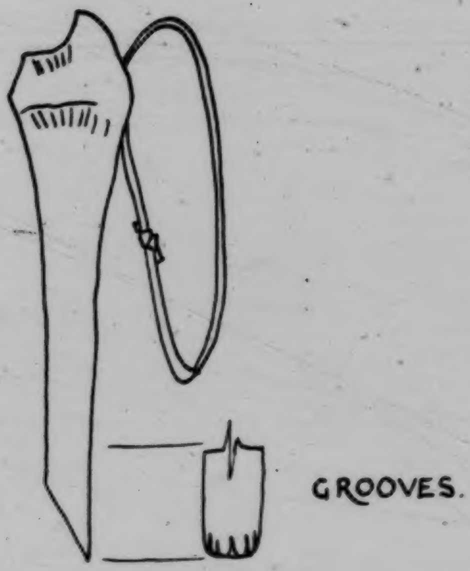


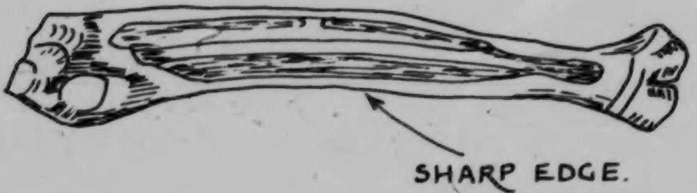
Figure 14. The Fleshing Tool Used to Remove Fat and Fascia from the Inside of the Hide

The flesher is made of bone in all cases and has not been superceded by steel in the area studied. The bone to be used for the flesher was first boiled for a long time and then shaped by a man so it had a saw toothed edge (Honigman, 1956:26). It must be assumed that this edge could easily be filed in or scratched with a sharp stone. A soft smoked leather wrist band was then fastened to the ligamentous tissue at the top and it was ready for use.

The Fox Lake Cree use the flesher exactly as described. They have a number of them in a cloth bundle and select one before starting on the hide. The writer did not observe them being sharpened, they all had a slightly rounded edge.

Skinner (1911:125) states that the fleshing tool was also used as a skining tool for removing the hide from an animal.

Scrapers. The scraper is used to remove the hair from the hide. Two types seem to have been used. The first is called a beamer, which was made from the foreleg of a caribou or moose (Honigman, 1956:265) (Curtis, 1907:68) (Losey, 1971:5, Fig. 36). The bone had been split in half longitudinally (Fig. 15). The second type of scraper was used on hides which were strung up on a frame. It consisted of a blade fastened at right angles to a wood handle (Fig. 16a).



(SKINNER, 1911:54)

Figure 15. A Scraper, Specifically Called a Beamer, Used to Remove Hair from a Hide which is Thrown over a Log

Prior to the introduction of steel a bone beamer was used to remove hair from the hide. Mason (1889:567) states that one half of the bone was removed to leave two sharp edges, but Curtis (1907:68) states that one edge only was sharpened. In use Honigman (1956:26) refers to a bone side scraper which was pushed away from the user while the hide was draped over a round log.

The steel scraper blade was an early Hudson's Bay Company trade item as a reference was made to it in 1682 (Rich, 1946:53). The scraper blade was a piece of high carbon steel which had a bevel filed on the cutting edge. This scraper was set in a wood or bone handle. The handle was grasped in the right hand and the wood containing the blade held with the left. The bevel faced away from the user. It was drawn down towards the operator with the right hand and a varying degree of pressure applied with the left. The sharp edge on the bevel could be finely turned by taking a hard piece of steel, e.g. scissors, and laying it flat on the side not containing the bevel and sliding it hard backwards and forwards (Fig. 16b). The hard steel is then placed on the bevel and tilted up about 5° so it is resting on the acute angled edge, and drawn backwards and forwards firmly. This turns the edge which will project down and backwards to the user, so ensuring a shaving action, rather than a scraping one. The tool used to turn the edge was called a ticketer and, as can be seen from the example of how the back of a pair of scissors could be used, only required that the tool be made of a harder steel than the scraper itself.

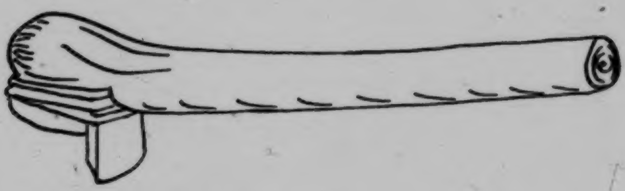


Fig. 16a. A Scraper with a Steel Blade Used to Remove Hair from a Hide held in a Frame

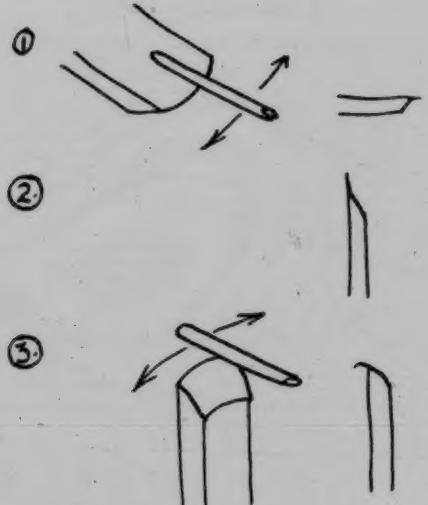


Fig. 16b. The Stages in Sharpening a Scraper Blade

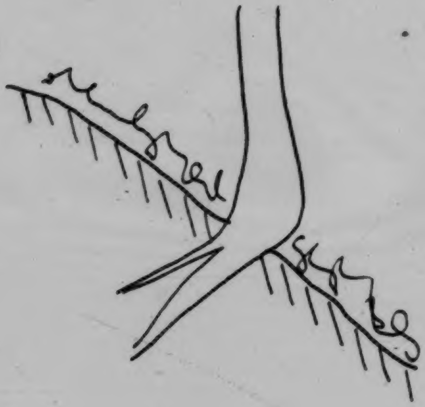


Fig. 16c. Location of Trees Used in Making a Scraper Handle

The Fox Lake Cree make their scrapers using the section from the lowest 12 inches of an Aspen sapling or any tree growing on a steep slope showing this bulbous characteristic (Fig. 16c). This particular habitat forced the sapling to buttress the lower outside edge into a large smooth curve, as the roots go laterally into the hill, which provides a comfortable grasping point for the left hand in the finished article. The sapling roots are removed and a notch, facing the long handle, but on the underside of the smooth bulbous section. This provides a platform, at right angles to the motion of the tool, for the steel scraper blade. The blade is placed in the notch with the bevel facing away from the long handle. It is fastened onto the platform with either nails or screws on some scrapers and with rawhide on others. Screws are a modern inovation, compared with nails,and the writer feels these would not have been in plentiful supply and acceptance until after 1900.

Snowshoe needle. An essential tool for lacing the intricate patterns of a snowshoe was the snowshoe needle (Fig. 17). This could be made out of bone or wood and had a hole drilled in the middle. A drawing was made of this simple device by George Isham and is contained in the observations and notes that he made while Factor at the Prince of Wales' Fort, Churchill River on Hudson's Bay (Rich, 1949:107). While no scale is given with his drawing, it is estimated that if the hole holding the lacing is 1/8 to 3/16 in, the size of most sections of lacing the writer has measured, the snowshoe needle would be 3 inches long, ½ inch broad and 3/16 inch thick, taking on the shape of a long pulled out parallelogram.

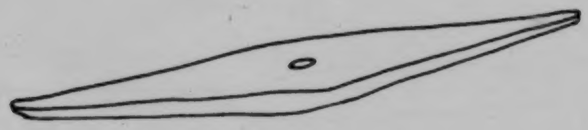


Figure 17. A Snowshoe Needle Used in Lacing Snowshoes

Isham's drawing indicates a rhombic hole in the middle. To the writer it would more likely have been circular, unless there was a specific reason for its angularity, since a square hole would be difficult to cut, compared with a round hole and would serve no conceivable advantage. Skinner (1911:45) shows a drawing of a snowshoe needle which was 3 3/4 inches long and can be gauged as being 3/8 inches wide with a 1/8 inch round hole in the centre.

Skinner (1911:45) and Honigman (1956:26) report that the snowshoe needle was made from a piece of wood or caribou bone but no details of its construction are given. The drilling tool or chisel as referred to by Honigman (1956:27) and described by Osgood (1940:85) would be capable of making a snowshoe needle centre hole by cutting and boring from both sides of the material. It must be assumed that the main shape would have been cut out with the steel crooked knife as a beaver tooth chisel is not hard enough. The use of bone in the snowshoe needle would have been a little more difficult to work because of its hardness. The Fox Lake Swampy Cree Indians do not use a snowshoe needle, relying entirely on manual dexterity.

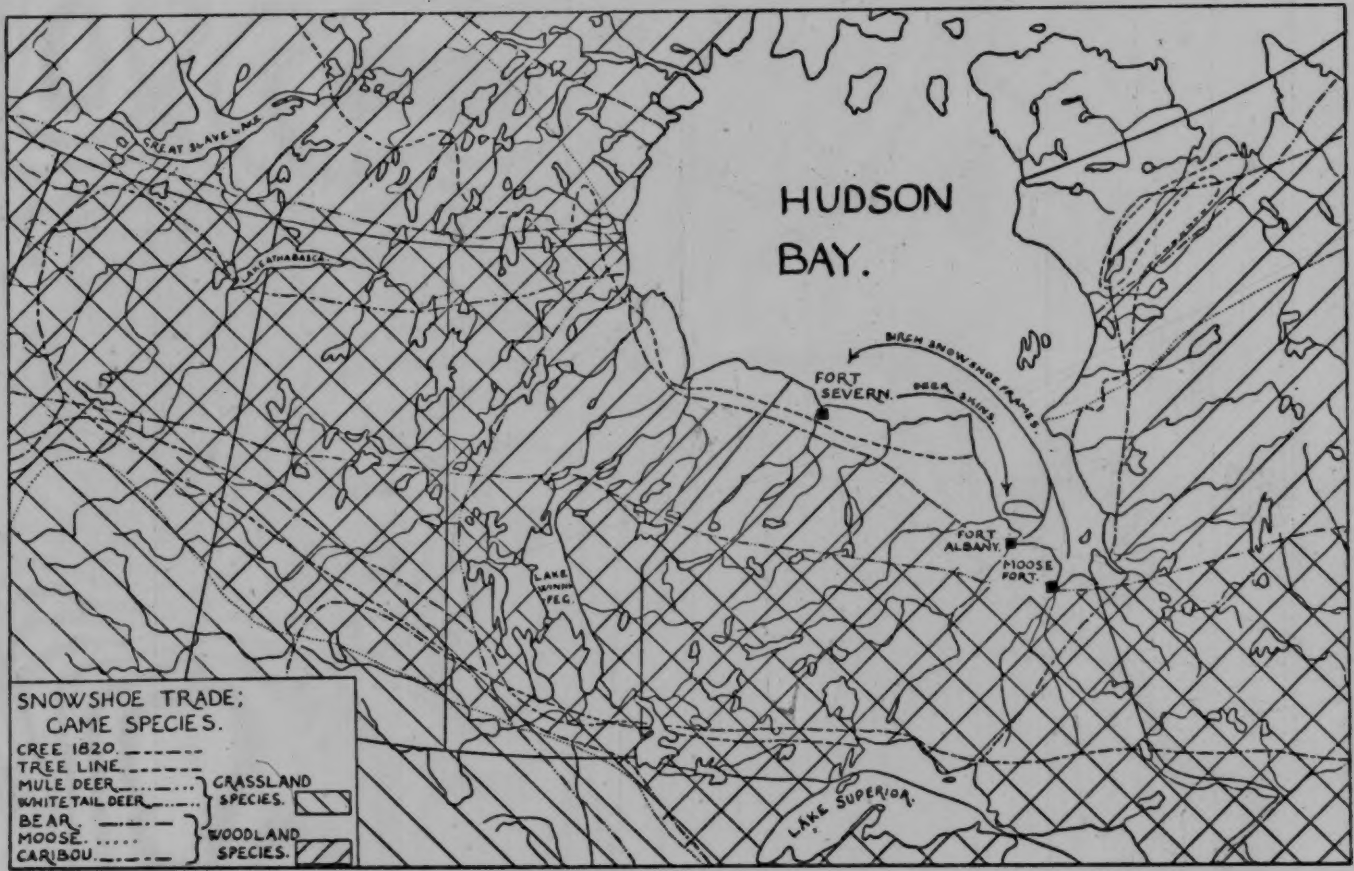
Chapter 4

MATERIALS USED IN SNOWSHOE CONSTRUCTION

The Snowshoe Frame

The Swampy Cree living around the South West Coast of Hudson's Bay used tamarak wood *(Larix laricina)* for their snowshoe frames (Honigman, 1956:53) since there was an absence of suitable birch trees growing in the area (Rich, 1952:XIV). Honigman states that if birch *(Betula papyrifera)* had been more common, it would have been readily substituted.

The lack of suitable material for snowshoe frames caused considerable concern to the Hudson's Bay Company trading posts around the West side of Hudson's and James Bay and engendered a close co-operation in the exchange of raw materials and the manufacture of snowshoe frames for distribution when they were needed (Map 3). William Falconer at Fort Severn wrote to Edward Jarvis at Albany Fort on January 23 in 1784 and said (Rich, 1954:181): "N.B. Pray send me a parcel of Birch Frames for Snowshoes as we can get no such thing here....". In a letter dated the same day and directed to John Thomas at Moose Factory he wrote a similar request (Rich, 1954:182,183): "Please if possible send us... as many snowshoe Frames as conveniently you can." John Thomas in his turn was short on deer skins and replied on June 3, 1784 (Rich, 1954:191,192):


HUDSON BAY.
GREAT SLAVE LAKE
L. ATHABASCA
LAKE WINNIPEG.
LAKE SUPERIOR.
FORT SEVERN.
FORT ALBANY.
MOOSE FORT.
BIRCH SNOWSHOE FRAMES.
DEER SKINS.
SNOWSHOE TRADE;
GAME SPECIES.
CREE 1820.
TREE LINE.
MULE DEER
WHITETAIL DEER
BEAR.
MOOSE.
CARIBOU.
GRASSLAND SPECIES.
WOODLAND SPECIES.

Map 3. Exchange of hides and snowshoe frames between Trading Posts. Important woodland and grassland game species range limits. (Rue, 1973:23,446,472,490,507) (Wonders, 1969:44,45)

> Birch for Snow Shoe frames etc. shall be sent and you could not do me a greater favour by the Sloop's return than by sending some Deer Skins, I declare i do'nt know what we should have done had it not been for the Deer Skins I retained from the Severn Cargo last Year.

This concern for deer skins is still on his mind on July 12, 1784, when he writes to William Falconer at Severn House (Rich, 1954:213): "I have sent...birch for Snow Shoe frames etc. and you would infinitely oblige me in sending by her return as many Deer Skins as you can spare."

The Fox Lake Cree use birch for their snowshoe frames exclusively. It is an abundant material to be found in the more open and better drained areas of the surrounding countryside. It grows to a height of 40 to 60 feet with long, straight, evenly tapered trunks, comparatively free of knots. The trees selected for the frame were, on average, 6 to 10 inches in diameter, at a height of 3 feet from the ground.

Snowshoe Lacing

A variety of animal species provided the Swampy Cree with any number of types of hide in different thicknesses to be used in the lacing of snowshoes. The Woodland and Barrenland caribou were important to the Swampy Cree in the Northern areas, while the moose was of more importance to the South (Skinner, 1911:26)(Curtis, 1907:62). Honigman (1956:29) states that fish skins provided fine line for the front and rear panels of the snowshoes. He goes on to say that strong cordage was made out of willow bark line in single and double braided thicknesses and was used in the center panel of the snowshoe. Other types of line available to the Swampy Cree originated from bear and calf moose skins (Honigman, 1956:28).

Snowshoe lacing available from the Hudson's Bay Company took the form of #5 cotton twine which was provided in large quantities (Rich, 1938:164,165). Honigman (1956:28) states that the introduction of #5 twine led to the decline in the knowledge of how babiche, or semi-tanned skin line, was manufactured. Another factor influencing the decline of knowledge in the manufacture of babiche could have been the drastic over hunting of game animals for supplying the trading posts and the brigades as they travelled the inland waterways (Ray, 1974:146,147). This resulted in a reliance on the Hudson's Bay Company to provide an alternative material which, in this case, was twine.

The Fox Lake Swampy Cree use cow hides which are brought into the community from High Level. High Level is 60 miles to the West, and in winter it can be reached by travelling over frozen muskeg roads. The hides are stored in the community freezer until needed. The volume of snowshoe production has outpaced the supply of hides available from local wild animal sources which stand to be completely eliminated if over hunted. What hides are obtained from local sources are kept for the making of moccasins.

Chapter 5

CONSTRUCTION METHODS AND TECHNIQUES

THE WOODEN FRAME

The Main Frame

The manufacture of the snowshoe frame was carried out by the Swampy Cree men (Honigman, 1956:27) who used wooden or bone wedges to split their chosen wood. This was no mean feat as James Isham at Prince of Wales' Fort wrote in 1743 (Rich, 1949:138): "It's a Little curious how they manage to gett pieces of that Length out of a tree, 14 or 16 inches thro, the frame of the snow shoe not being above one inch thick one way, and one and ½ inch the other way...". The writer observed the Fox Lake Cree cutting their birch logs in 5 foot 6 inch lengths which were skidded out of the frozen bush behind horses and oversnow vehicles. They were then deposited in a horse drawn wagon and taken into the Fox Lake Community and placed on the frozen surface of a slough. In spring the logs are deposited into the water and therefore prevented from drying out.

The carpenter of the Hudson's Bay trading post was expected to make the frames for the general use of the employees. There are frequent references to this effect in journals, such as that kept by Robert Longmoor at Hudson's House. On December 11, 1780 he states "the Carpenter and two men away in the Woods falling and Splitting Snow Shoe frames...". When necessity called,no man was beyond the call for any type of job required at that time. We find William Tomison (Rich, 1952:219), Master at Cumberland House, writing in his journal on November 9, 1781, "Mr. Longmoore and one Man hewing stuff for Sledges, Myself making Sledges and snow shoe frames...". We must assume that the trading posts'supply of hand tools, even if it were only a basic kit, would have included a drawknife and plane of some sort. The beetle and wedge are indispensable items. A shaving horse would have been used to hold the wood while it was being worked. With these tools the final shaping of the frame could be achieved before bending. No reference has been found of how the Swampy Cree bent and formed the snowshoe frames.

Honigman (1956:53) states the wood (tamarak) was shaped with a knife and dried for six days. Then it was bent across the knees of the worker. The time lapse of six days seems unusual,for the wood is best bent green, not when it is dried out.

The Fox Lake Cree draw logs from the slough when needed and use either of two methods to split them. In the first method a wedge is inserted into an axe cut made into the end grain of the log. It is then struck till it is flush with the end of the wood. The second wedge is placed further down the wood in the split and is driven down and in at a slight angle. The first wedge is recovered and placed in the narrow split being opened and so on. An alternative method is to use the two axes (Fig. 18).

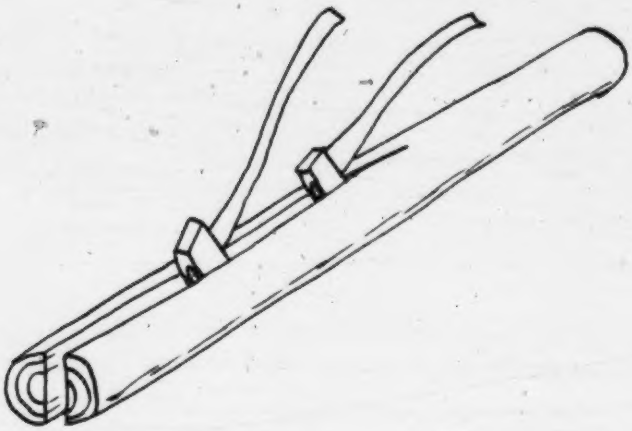


Figure 18. Splitting Wood for Snowshoe Frames

The first is driven into the end grain and hammered in by being struck on its poll by the poll of the other axe. When it is driven in as far as it will go, then the second axe is swung and driven into the split tightly. The first axe is removed to be used to strike in the second axe and then to drive it in again. This process is repeated down the length of the log. If any material still connects the two halves of the log and is preventing effective use of the wedges, then they are cut with the axe. The wood is split and trimmed into further sections until the appropriate sized material is obtained (Fig. 19).

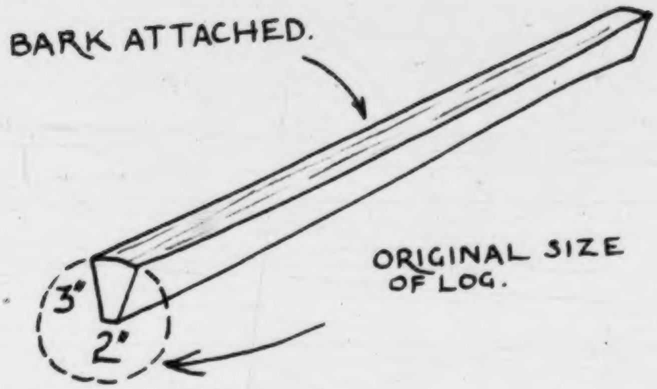


Figure 19. A Rough Blank of Wood Ready for Reduction to a Frame Section

The resulting wood should have a straight grain and an approximate cross section of 2 inches by 3 inches. The bark is kept on the edge and not removed.

At this stage the rough 2 inch by 3 inch blanks each have their narrower surfaces designated top and bottom. These rough blanks are given their next to final shaping with a small table saw in the community workshop. The final cross section is 1¼ inches by 3/4 of an inch (Fig. 20). The shaping is done with considerable care, for bending of the toe can be made easy or next to impossible, depending on the manner of cut. To achieve the ease of bending, any natural curve towards what would have been the centre of the tree at a tip, is kept along with the cambium layer between the wood and the bark. In all cases the end which will have the toe, keeps the absolute straight grain and is not cut in any way.

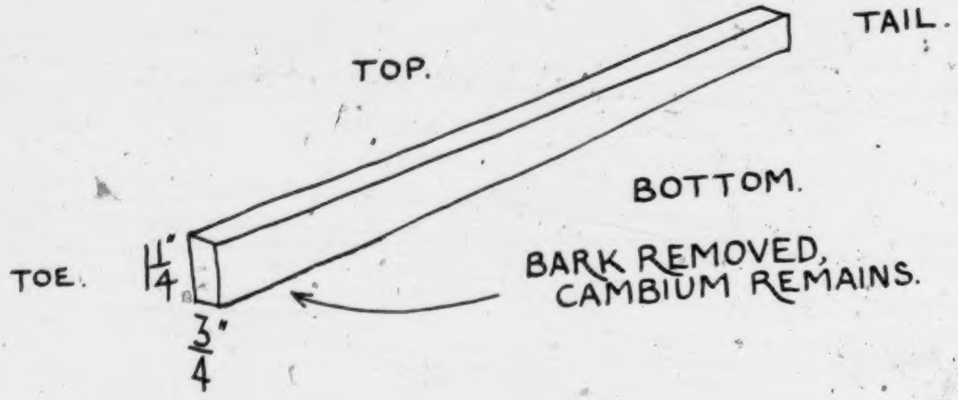

TAIL.
TOP.
BOTTOM.
TOE.
$1\frac{1}{4}$"
BARK REMOVED,
CAMBIUM REMAINS.
$\frac{3}{4}$"

Figure 20. First Stage of Reducing Wood Blank to a Frame

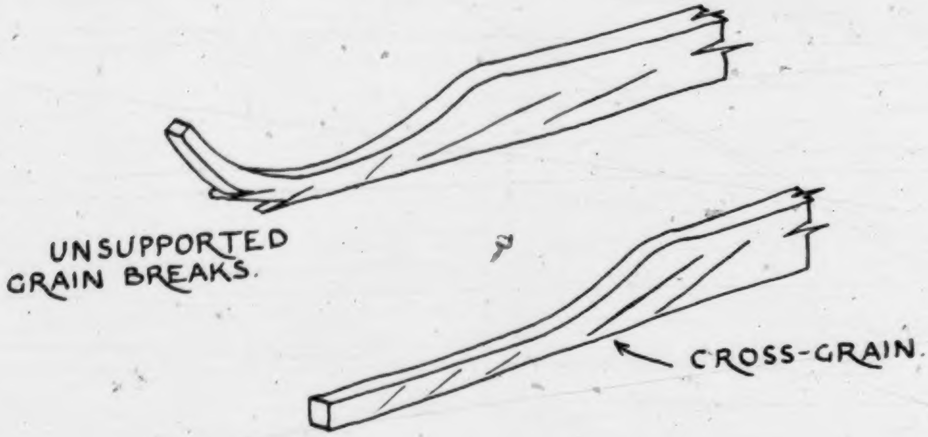

UNSUPPORTED
GRAIN BREAKS.
CROSS-GRAIN.

Figure 21. Effect of Cross Grain on Bending at the Toe

If this toe section were to be cut in any manner, then the end grain of its wood or some unconnected fibres would be exposed. The angle of the exposed fibres at the frame surface would allow splitting into the frame since expansionary pressure from bending would tend to pull apart the unsupported fibres (Fig. 21).

At this stage the frame side sections are given a designation, left and right, but are not paired.

The smoothing plane is then used on each surface to remove the table saw marks and to thin down the toe section. One eighth of an inch is removed from width and height of each dimension during removal of the saw marks. The thinning starts from a position 1/3 the way from the toe on the inside of the curve to be, to a cross section of 3/8 of an inch high and 5/8 of an inch broad (Fig. 22). The tail section is also thinned down on the inside with the small smoothing plane to produce a long taper which starts 1/3 of the way from the tail. The cross section so achieved at the tail is now 1 1/8 of an inch vertical and ½ an inch broad. The length of the plane sole precluded its use for obtaining the rapid drop off in thickness at the start of the 7 inch long thin toe section (Fig. 23). This area is cut out with a crooked knife which has a sole length of at the most 5/8 of an inch and can therefore cut out the slightly concave toe section. The cross section at the toe now measures 5/8 x 3/8 inch. Further shaping is carried out with the crooked knife on the top outside edge of the snowshoe.

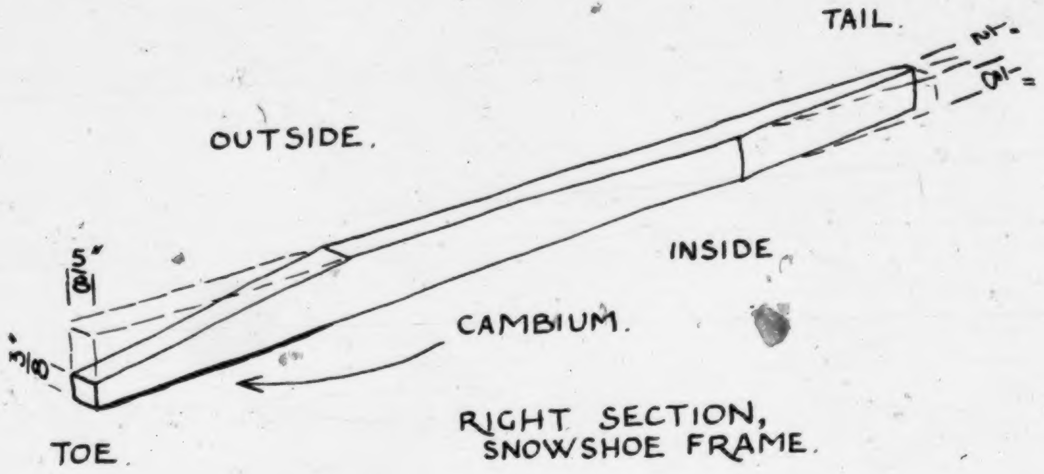

TAIL.
OUTSIDE.
5/8"
3/8"
INSIDE
CAMBIUM.
RIGHT SECTION,
SNOWSHOE FRAME.
TOE.

Figure 22. Second Stage of Reducing Wood Blank to a Frame, Tapering

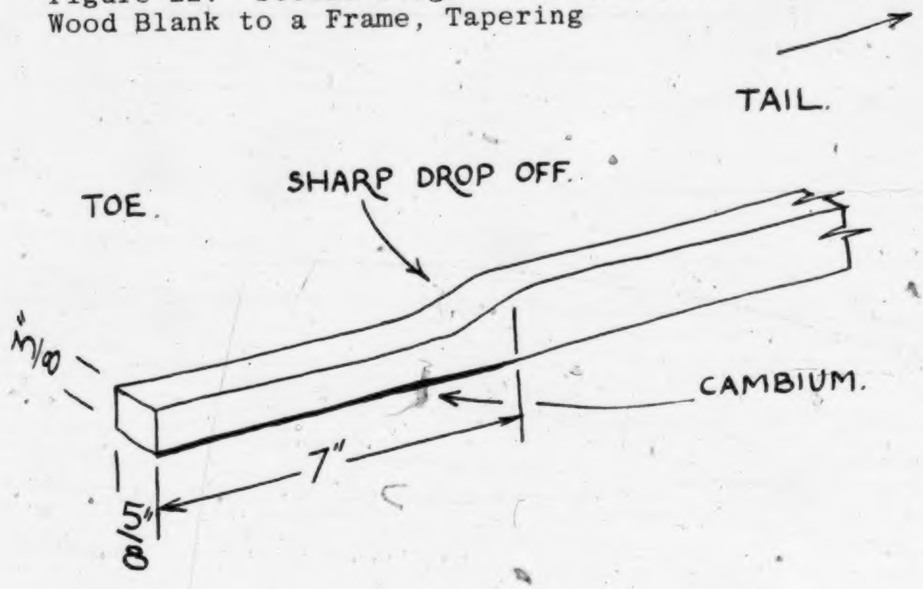

TAIL.
TOE.
SHARP DROP OFF.
3/8"
CAMBIUM.
7"
5/8"

Figure 23. Third Stage of Reducing Wood Blank to a Frame, Toe Thinning

This material is removed with a crooked knife to produce a 10 inch taper, starting at nothing and running out to the toe's diagonal made by the rectangle 5/8 x 3/8 (Fig. 24). All the corners are carefully rounded off. The resulting cross section at the tip is triangular with the hypotenuse facing out and upwards.

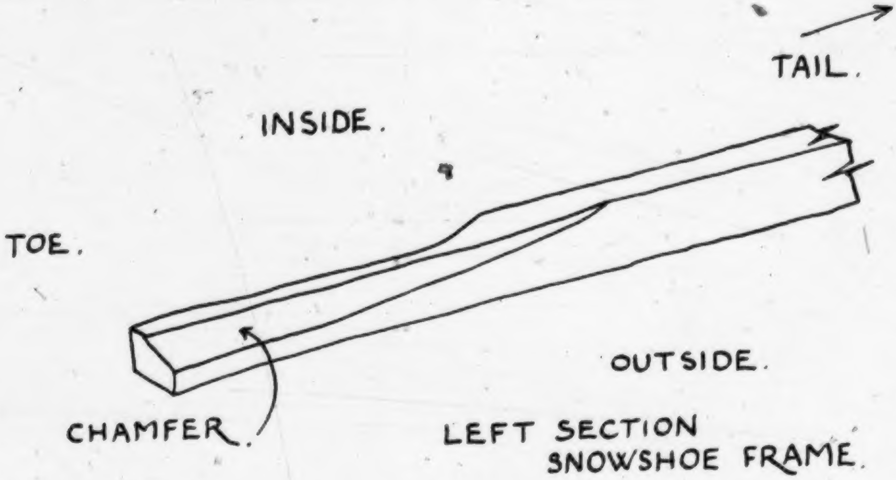


Figure 24. Fourth Stage of Reducing Wood Blank to a Frame, Toe Chamfer

An equal number of left and right handed frame members, toes pointing down, are then placed in a 50 gallon drum of very hot water that is supported on rocks over an open wood fire. A two inch layer of wood ash slurry in the bottom of the drum dissipates the heat evenly and not directly onto the snowshoe toes, as would be the case if there were no protection. Wood shavings and scraps of wood from the workshop are fed into the fire under the drum, and the frame members are heated for an hour. The water does not boil.

Each frame in turn is removed from the barrel and the toe tip bent first of all by placing it underfoot and levering up (Fig. 25). As the bend was gained, it was rounded out by placing beneath the knee and a right angle achieved between the toe tip and the main section of the frame. The curve is achieved along the thinned section of the toe. As pressure was taken off the toe, it reverted back almost to its original straight position. No effort is made to achieve any lateral bending of the toe at this time.

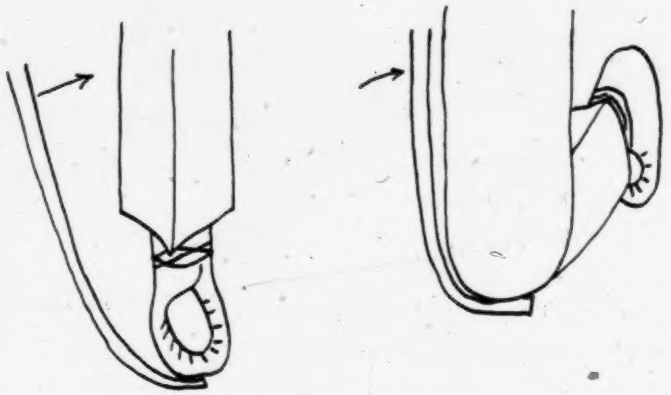


Figure 25. Bending the Toe Under the Foot and Knee

A shallow notch is cut in the toe on the outside, diagonal sloping surface of each frame member (Fig. 26). A shallow veed notch is cut in the tail at right angles to the wood fibres of the outside frame member of each of a pair of snowshoes (Fig. 27). It is cut 3 inches from the tail and continues across the full width of the wood. The notch provides a weak point at which the frame member bends when the lateral spacing bars are inserted between the individual frame members and take up a directly parallel position to its opposite frame member.

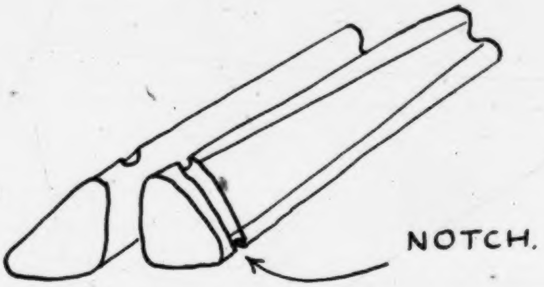


Figure 26. Notch Cutting of the Toe for Binding

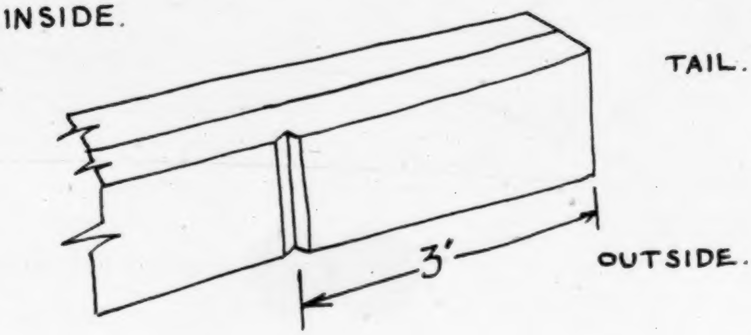


Figure 27. Notch Cutting at the Tail for Bending

The frame members are paired off left and right and tied tightly with binder twine in the toe notch and just behind the tail notch on the tail side. The paired sections are now placed in the hot water, toes down and then tails down to soak for an hour in each position. They are removed and a small spacer bar, 6 x 1 inch, is placed between the two frame members, so they are spread laterally (Fig. 28). The tail section being weakened by the V cut, forces this member to one side. A set of paired frames is now taken and transferred onto one small spacer bar.

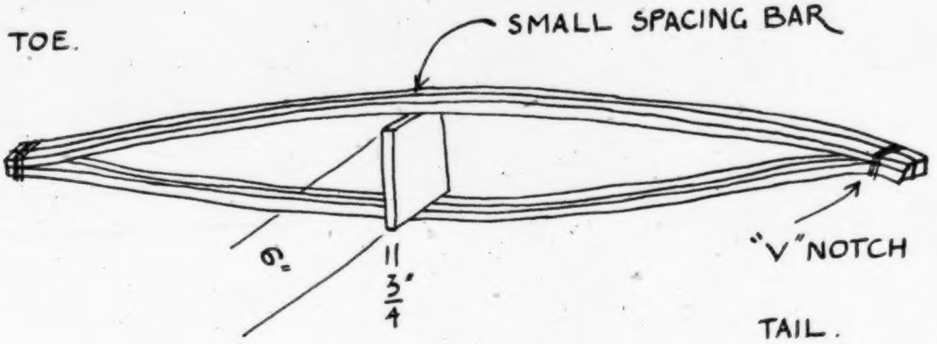


Figure 28. First Stage of Bending the Frames, Small Spacing Bar

The paired frames are tied together with baler twine at three points, the tail, the centre section and at a point just behind where the toe curve starts (Fig. 29). They are not tied at the tips, apart from being attached to their own counterpart. However, a 6 foot length of baler twine is firmly attached to each individual toe. The paired snowshoe frames are now placed in the 50 gallon drum and boiled once again.

On removal the toe curves are worked into shape and held there with the baler twine which is fastened to the tail. The curves are adjusted by viewing the pair from the side and taking in or letting out the string.

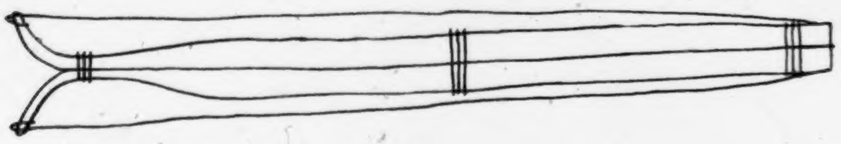


Figure 29. Second Stage of Bending the Frames, Tying the Frames and Bending the Toes

A larger spacer bar, measuring 10 x 1 inch, is pushed between the two frame members (Fig. 30). Any irregularities of the lateral curves on the side members of the frame are evened out by applying tourniquet twists between the side members and pulling them into shape. These completed frames are hung up in the workshop and left to dry for two weeks.

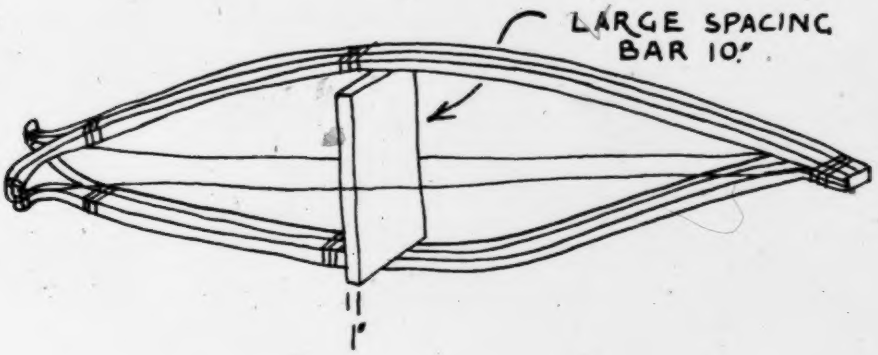


Figure 30. Third Stage of Bending the Frames, Insertion of Large Spacing Bar

Crossbars

No rigid rules of measurement for placement of the crossbars are used, for the snowshoes are individually handmade and related only to each other as a separate unit. What positioning and marking out which does occur is of the nature of offering up. This is achieved with a thin birch slat having slightly smaller dimensions (3/16 of an inch smaller) than the full sized crossbar.

The positioning of the crossbars is determined with three birch slats which are slipped between the pair of snowshoes while they are still tied together (Fig. 31). This is easily carried out, since the binder twine is loose, due to the shrinking of the once green wood. The experienced eye of the craftsman is then used to judge the accuracy of the positioning and adjustments made where necessary. The toe and heel crossbars are positioned so that they divide up the frame longitudinally into 3 parts. The center distance is large enough to take a foot and have about ten inches to spare. This section is centered exactly in the middle and covered somewhat less than 1/3 of the longitudinal distance.

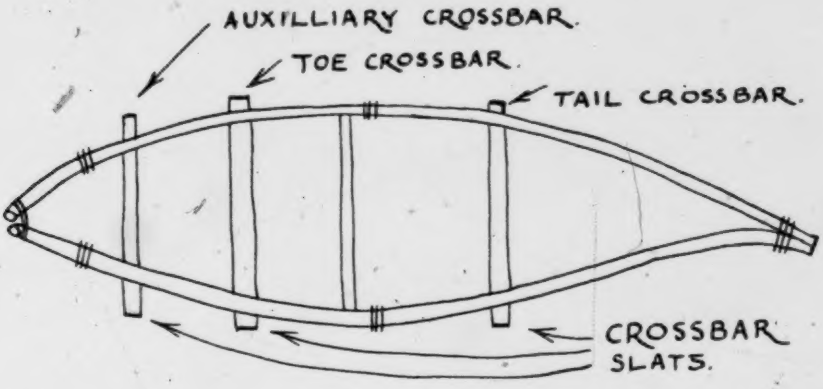


Figure 31. First Stage of Crossbar Insertion, Offering Up

A third auxilliary toe crossbar slat is positioned just behind the curved toe section. Its prime function is to keep apart the frame members in the toe region, as they have a tendency to pull in when the lacing has pressure applied on it by the snow. When all the slats are positioned to the satisfaction of the craftsman, he marks off the positions on the inside of the frame with a pencil and then dismantles the two frames by untying the binder twine.

The crossbar positions are then marked across the frame members with a pencil and the straight edge of a piece of wood.

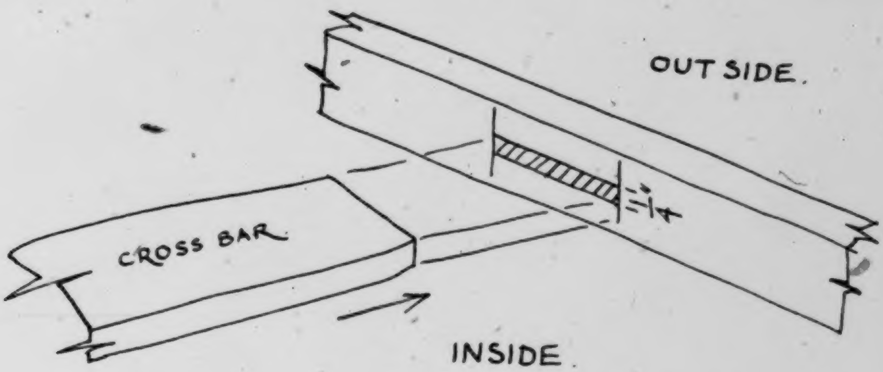


Figure 32. Second Stage of Crossbar Insertion, Marking the Mortice

The end cross section of the appropriate crossbar, slightly undersize by 3/16 of an inch, but a full ¼ inch thick, is then placed between the two lines running at right angles to the grain of the frame members and a pencil line drawn along the edges (Fig. 32). This results in a pencilled rectangle drawn in the centre of the wood which gives guidance to cutting the mortice.

A quarter inch mortice chisel is used to cut out the 5/6 inch deep mortice for the crossbars (Fig. 33).

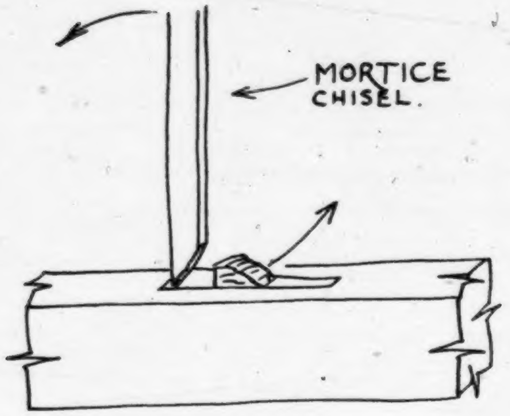


Figure 33. Third Stage of Crossbar
Insertion, Cutting the Mortice

The frame member is held down on the floor with a knee while this is being cut and then held across the top of the knee while the wood chips are levered out. Previously cut standard sized crossbars made of birch are then offered up to the appropriate mortices and note taken of the difference in size. Thin shavings are then removed from the end of the crossbar with a canoe knife till it fits firmly and has an adequate depth for good holding power.

The toe crossbar has a 2½ x ¼ inch slot cut along the length in the centre (Fig. 34). This is drawn in by eye with a pencil, drilled out with a small electric hand-drill and given its final shaping and smoothing with a utility knife. Its function is to allow the toe lacing to be attached around a firm support, but not be subject to wear and tear by the toe of the individual snowshoer if it is pushed forward.

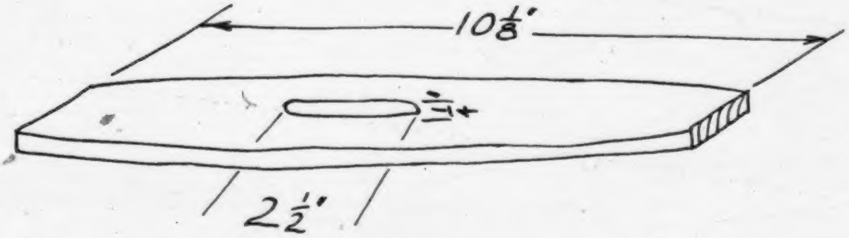
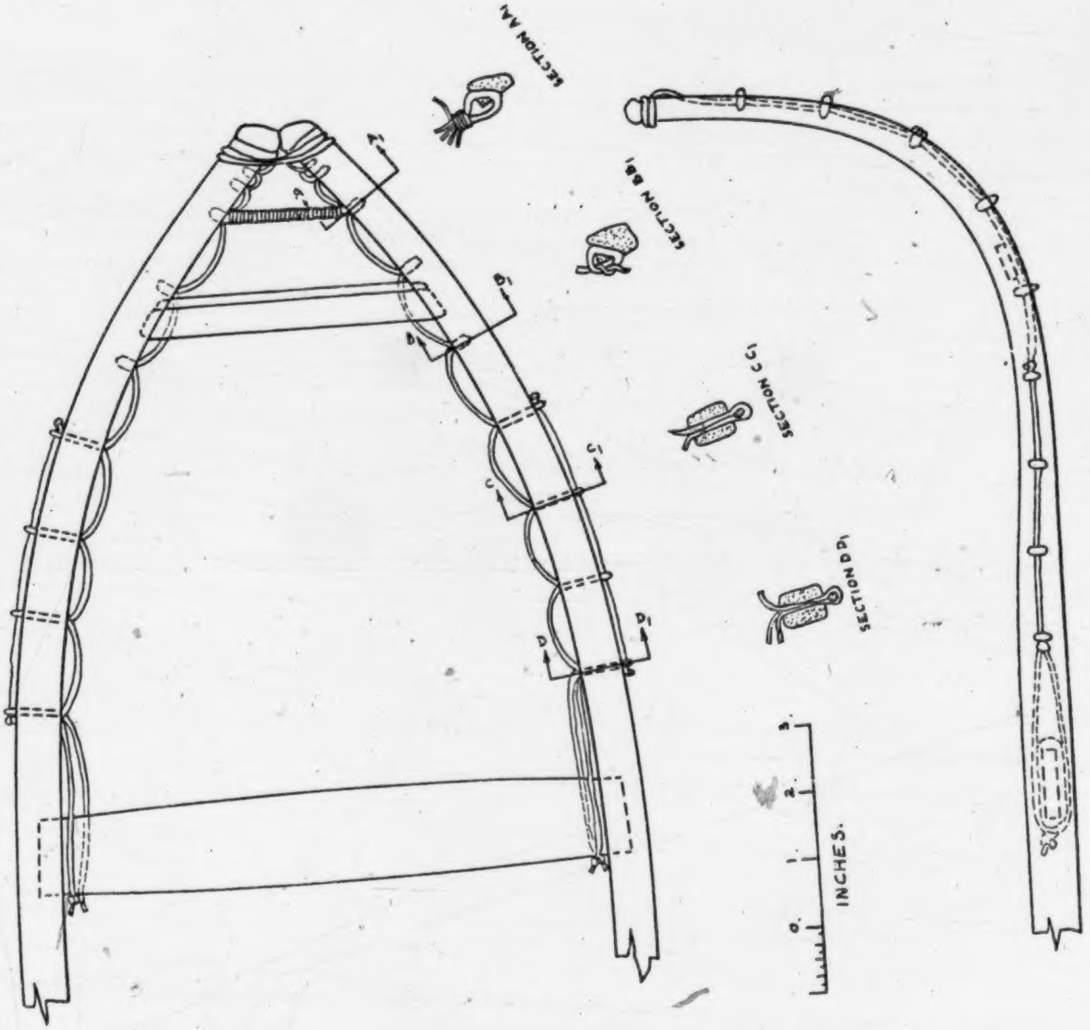


Figure 34. The Toe Crossbar Slot

Selvage Thongs

Paired selvage thong holes are then drilled laterally at 1 3/4 inch intervals through the frame members of the toe and heel sections (Figs. 35, 36), except for the section from the auxilliary toe crossbar to the snowshoe tip. (Fig. 35 section on A,A';B,B'). Here the frame members are thinned down to 3/8 of an inch and they cannot sustain a hole at that angle without seriously weakening the toe. The alternative is to drill a hole through the frame member parallel to the hypotenuse of the triangular cross section of the snowshoe tip. After the fifth selvage thong hole from the tip the holes are drilled horizontally.


SECTION AA1
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SECTION CC1
SECTION DD1
A
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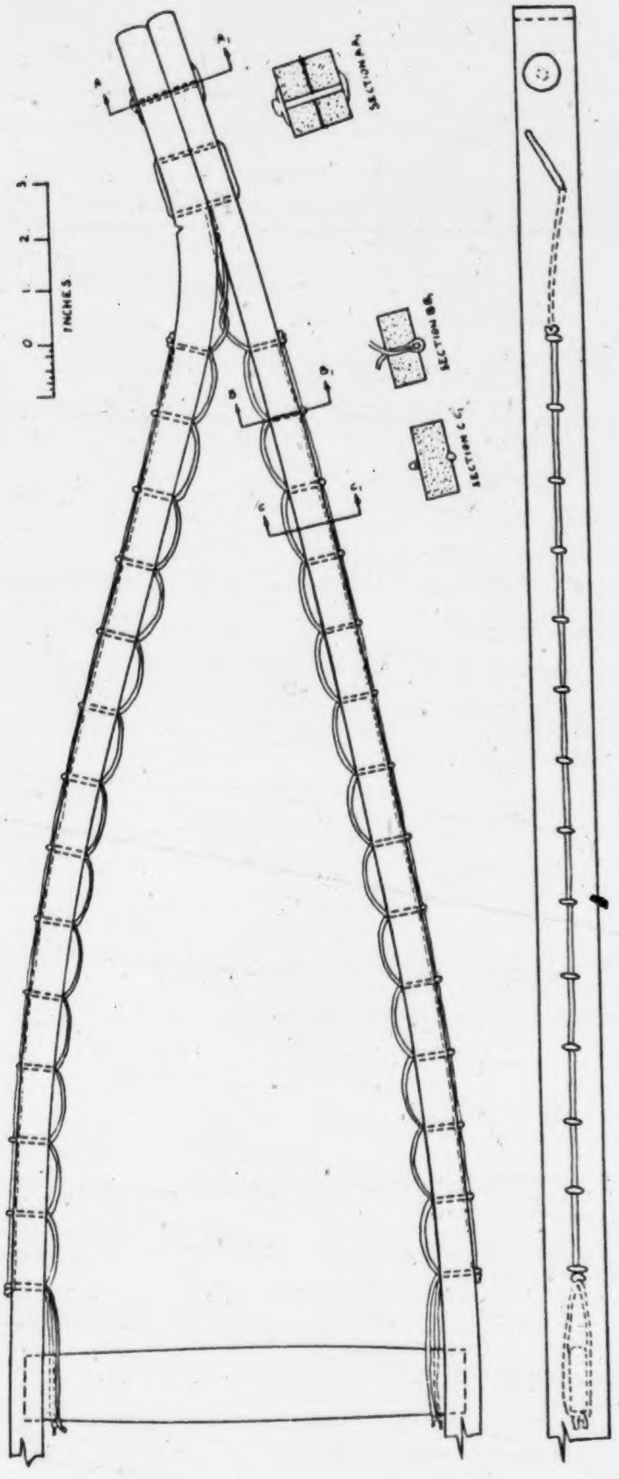
INCHES

Figure 35. Selvage thonging of the toe section


INCHES
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A1
B
B1
C
C1
SECTION A-A1
SECTION B-B1
SECTION C-C1

Figure 36. Selvage thonging of the heel section

The section from the auxilliary crossbar to the tip has a vertical hole drilled through each frame member at a position midway between the two sides. This is for a 4 strand multiple rawhide lacing tension support to hold in the side frame members and also to support the toe lacing when it is under snow pressure. The auxilliary bar and rawhide lacing tension bar therefore have directly opposing functions. The selvage thong holes in the last three inches of the tail have the prime function of holding the two frame members together (Fig. 35). They are in a vulnerable position with regard to splitting of the tail section if they are drilled at the same midline as the other selvage holes. They are therefore staggered so the same longitudinal grain is not cut more than once.

The selvage thong, when threaded through the holes, is exposed and can be easily abraided or cut by brushing against rock or wood. To alleviate this problem, a V-shaped groove is cut, with a utility knife, between each selvage thong hole (Fig. 35, section on C,C'). The selvage thong therefore lies in this groove and is protected. Honigman (1956:27) states that the Swampy Cree used beaver tooth drills to cut holes in the snowshoe frame, as well as incise and remove wood for the countersinking of lacing.

Material for the selvage thong is rawhide, purchased from the local Hudson's Bay store. It is thin material, about 1/8 inch in diameter, and passes through the holes in the frame quite tightly. It is used without any presoaking preparation to bind the toe together at the notches and the tail section through the corresponding holes on each side of the frame members. It is also used for the multiple tension support running across the toe width situated midway between the toe notches and the auxilliary crossbar. It is run through the vertical holes in the frame four times. These four lines are then laced together tightly by binding the same type of lacing around them.

To support the lacing, the selvage thonging is then tied tightly around the notches cut at the snowshoe tip and the thongs taken down and threaded through each selvage thong hole and a square knot tied before going onto the next hole (Fig. 36, section on B,B').

In the case of the snowshoe tail the selvage thongs are threaded through the last hole but one, back to the last hole and threaded from both directions to the opposite side (Fig. 37). They are then passed through the second from last holes to the mid point and then taken down with two twists to the first selvage thong holes.

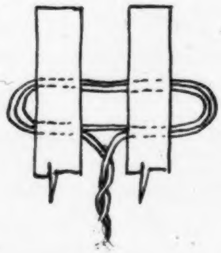


Figure 37. Selvage Thong Lacing Binding The Tail

The selvage thong on the inside in both the toe and tail is then taken to the next hole down the frame, passed horizontally through and around the outside selvage thong retaining cord and back on itself again. This is continued along the two sides of the toe and heel sections. At the point where the selvage thong comes out and passes around the toe and heel crossbars to be tied off, the selvage thong retaining cord, after being knotted, is also passed through (Fig. 36, section on D,D'). Both selvage thongs are then tied in a square knot.

The snowshoes are then taken to the home of women in the community to be laced.

PRODUCTION OF LACING

Introduction

Previous references have been made to the fact that the Swampy Cree woman was responsible for preparing hides. The economic importance of the Indian women in the affairs of the Hudson's Bay Company was considerable. The Council at York Factory (Kirk, 1972:4) in 1802 stated in an appeal to the London Committee in justifying the cost of maintaining extra servants of The Company,

> ....we wish to remark that the women are deserving of some encouragement and indulgence from your honors... They prepare line for Snow shoes and knit them also without which your Honors servants could not give efficient opposition to the Canadian Traders...

The importance of the woman's economic role and her right to be remunerated for her labours appears to have been accepted and recognised by the Hudson's Bay Company in Prince Rupert's Land. George Simpson (Rich, 1953:76n) writing to Bell at Norway House on June 28, 1847 states:

> Three of the men attached to the expedition will be accompanied by their wives, as the services of females may be useful in washing, making and mending the people's clothes and moccasins, netting snow shoes and repairing nets, and other necessary work; these women, of course, will have to be maintained as a charge on the expedition, to be moderately remunerated for any public services they may render, but to be paid by the people themselves for washing, etc.....

The hides for the snowshoe lacing came from many large game animals (Ray, 1974:29). Up to about 1763 overhunting for food by the Swampy Cree and Trade Posts was confined to the areas around Hudson's Bay (Ray, 1974: 147). In 1779 Philip Turnor (Tyrrel, 1934:274) of the Hudson's Bay Company noted that the Indians around Gloucester house were short of dressed leather for they "trade Cloth, Blankets, Powder, Shot etc., which they cannot do without having no leather in their Country". The raw materials therefore for the lacing of snowshoes could not always be obtained and were probably in short supply. The Hudson's Bay Company could supply an alternative for the lacing in the form of #5 twine (Rich, 1938:164,165). A brisk trade existed between trading posts in birch snowshoe frames (Rich, 1954:181) and hides (Rich, 1954:191,192), depending on their geographic location, and the lack of or abundance of these materials (Map 2).

Rawhide

Skinner (1911:33) indicates that there are three processes involved in making rawhide: flaying, fleshing and scraping.

Flaying. Skinner (1911:33) states that the Swampy Cree flayed the animal by cutting it down the belly and up the inside of the leg. The skin was then removed by using a wedge shaped skinning tool (Skinner, 1911:125, fig. 42) which appears to be exactly the same as a fleshing tool. The Fox Lake Swampy Cree have their hides already flayed, but not fleshed, in meat packing and slaughter house plants.

Fleshing. Honigman (1956:27) says the hide has to be fleshed soon after the animal was butchered and so prevent rot. Mason (1889:567) and Skinner (1911:33) state that the hide is fleshed first but give no time limit as to how soon it should start to be processed after it has been flayed. The Fox Lake Cree take out a frozen hide from their deep freeze locker and leave it out in the open for 3 days to defrost.

Driver (1961:165) states that the hide was fastened to a rectangular framework of poles so that it was held firmly and could be worked upon while standing up. Thongs were run through holes on the periphery of the hide and wrapped around the wood frame. The Swampy Cree Indians of

Fox Lake have a large rectangular frame measuring 10 feet by 9 feet (Fig. 38). The logs are of 4¼ to 6 inches in diameter and are lashed firmly at each corner which overlaps another log at right angles by 12 to 18 inches. The frame is placed on the ground and the cowhide spread out in the middle of it, hair side down. Small cuts 1½ inch long are made with a woman's knife parallel to the edge of the hide, 1 inch from the edge, and at 6 inch intervals.

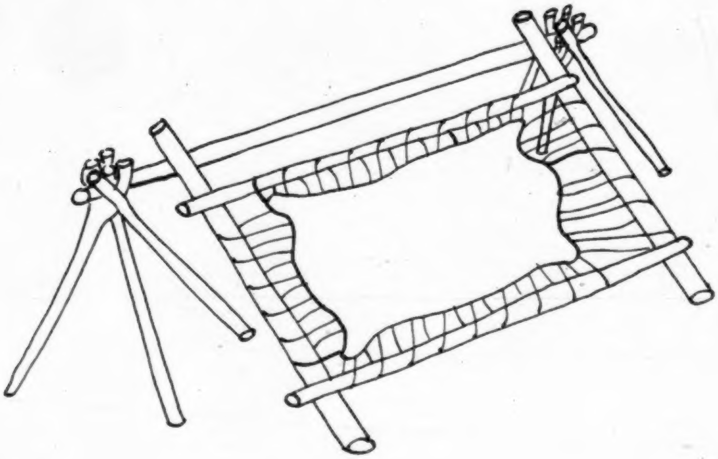


Figure 38. - The Frame and Support for Fleshing and Scraping the Hide

A 3/16 inch nylon cord is threaded around the frame and through a cut, and this process is repeated for each cut. Four separate cords are used, one for each side. One cord for each side makes for easier use since frequent tie off points reduce the necessity of pulling through large lengths of rope and allow for small adjustments of tension, the latter being required when the hide is being fleshed and scraped.

When sufficient tension is obtained and the hide no longer sags, one end of the frame is propped up at approximately 25° against a crossbar supported at either end by a series of three forked poles arranged in tripod formation. The inside of the hide is uppermost. A thin 3 inch diameter sapling is then threaded through the nylon cord at either side of the hide, about 3 feet from the top, and a piece of canvas placed on top of it. Two Indian ladies kneel on top of this working with their fleshing tools. The tool is held with the bevel facing away towards the hide,and the wrist slips through a tanned leather loop. The leather loop gives strong support when the flesher is used, so the hand does not have to grip tightly. Steady rhythmic blows of the sharp, serrated tool edge strip off rapidly the inside fascia and fat. As work progresses downwards, the sapling is adjusted accordingly. The scraps of fat and fascia are dropped to the sides of the frame and are hungrily eaten by the Fox Lake Cree's dogs.

The fleshing process takes a little over one and a half hours to complete, at which time the lower end of the frame is propped up with a couple of forked sticks and is now horizontal to and 6 feet off the ground. The frame is left like this till the bluish,transparent tinge of the hide has changed to a solid white, indicating a certain drying of the hide. This takes about 24 hours, depending on the temperature and humidity. The warmer the temperature and the lower the humidity, the quicker it will dry.

Scraping, dehairing. Mason (1889:567) quotes Lucien Turner as to how the Naskopi Indians, who are the Eastern Branch of the Cree Indians, living to the East of Hudson's Bay, remove the hair from their hides. The Naskopi, who have access to some of the same animal species as the Swampy Cree, remove the hair from the skins by wetting them and throwing them into a pile. This allows the hair to rot in the follicle and so become loose and "slip". Skinner (1911:34) on the other hand, talks about shaving the fur with a beamer, which indicates that the fur is still held firmly in the follicle. Mason (1889:567) refers to a "skilful push" of the beamer which dislodges the hair. Honigman (1956:27) talks about removing the moistened hair with a side scraper. It appears that there are varying approaches to preparing the hide prior to removing the hair. All techniquesmust be effective, otherwise they would not be used.

In all the forementioned cases the hide is placed over a log. Honigman (1956:27) states that the log is split but questions which side, the flat or round, is used. Mason (1889:567) states that the log is 3 to 4 inches in diameter. The hide is placed so that the hair points towards the worker (1889:567 (1911:34) and the bone beaming tool pushed with its sharp edge pointing downwards and forwards. The hair is thus shaved off or pulled from its follicle to leave a smooth finish (Fig. 39). The hide does not move because the worker's body pins it to the log.

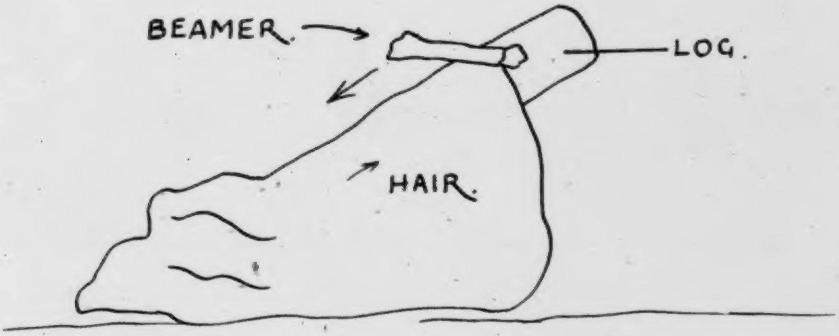


Figure 39. Scraping the Hide with a Beamer

The Fox Lake Swampy Cree take down their frame from the supports which keeps it horizontal and reverse the frame so it is now hair side up with the hair pointing towards the worker. The frame is allowed to rest at the original 25° angle supported by its 3 tripod leg supports. The sapling is rethreaded and the hair cut off with hide scrapers. These are drawn downwards towards the user and the steel blade, set at right angles to the handle, removes the hair with its turned and ticketed edge. It is well to note that the hair is cut or shaved off cleanly at the hide surface. The steel scraper blade can effectively reach the lower end of the hair as it enters the follicle. If the hair faces away from the worker, the scraper has to raise the hair first before getting at its root to cut it off.

When completed, the hide is cut from the frame with the woman's knife, leaving a thin strip of hide still covered with hair attached to the nylon tension ropes and frame. The still malleable hide is folded into a compact bundle and left to dry, in which state it will keep almost indefinitely.

Prior to the cutting of the hide for lacing, it is soaked in water from 24 to 48 hours to reduce it to a soft, pliable texture. The condition of the hide for cutting at this point is critical. It must be dry to the touch and have an even texture and saturation throughout. If too wet, the hide is extremely thick and rubbery and difficult to cut. It is considered suitable to use when it dries in the air for a period of time and attains a darkening surface colour. A cross section cut from a piece of hide prepared in this way shows even colour throughout. It is then removed and cut, at right angles across the back, into three strips, which are easier to manage than the whole hide in one. A pair of scissors are then used to start cutting off a strip ½ inch wide, paralleling the long edge of the hide. The hide is turned around and a helper holds the just cut stub and the main piece of the hide (Fig. 40).

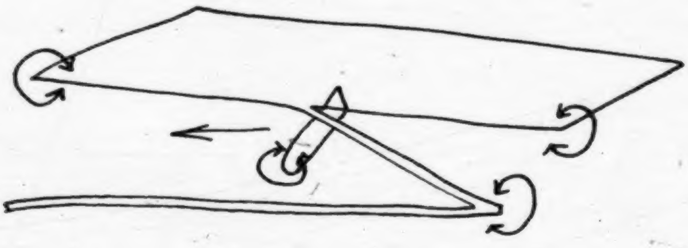


Figure 40. Fox Lake Method of Cutting the Hide.

A utility knife is inserted into this cut and the thumb of the same hand placed along the hide edge and is used as a thickness gauge. It is drawn slowly towards the cutter. As the cut progresses, the helper pulls the lacing out to one side which helps ease the utility knife through the hide.

When the end is almost reached, it is stopped short by an amount equal to the thickness of the lacing. Another scissor cut is made twice the thickness of the lacing away from the outside edge of the first lacing strip. The hide is reversed and another parallel cut is made. This process is repeated till each piece of hide is reduced to one continuous strip. A square tab is left on the line every time a fresh cut is started. It is then cut into lengths of anywhere from 30 to 45 feet and wound around the thumb and upper arm into loops. These are then tied together and hung on the outside of the house to dry. It stays in this state till it is required, whereupon it is soaked for about 24 hours and is then ready for use. A shorter soaking period is required, compared to the large sheets of rawhide, due to the smaller cross section offered to the water and therefore the ease of its penetration.

Willow Bark Lacing

Honigman is the only reference which includes the making of willow bark line, which was used for the centre snowshoe panel (1956:29). According to the description by Honigman, in summer the thin willow branches had their bark peeled into the desired width of about 1/8 of an inch. In winter the willow branches were thawed out by the fire, peeled, and then split. The split willow was then allowed to dry if not needed immediately. When braiding was to be carried out, the willow was soaked in water to make it pliable. No details of the braiding process is given.

Fish Skin Lacing

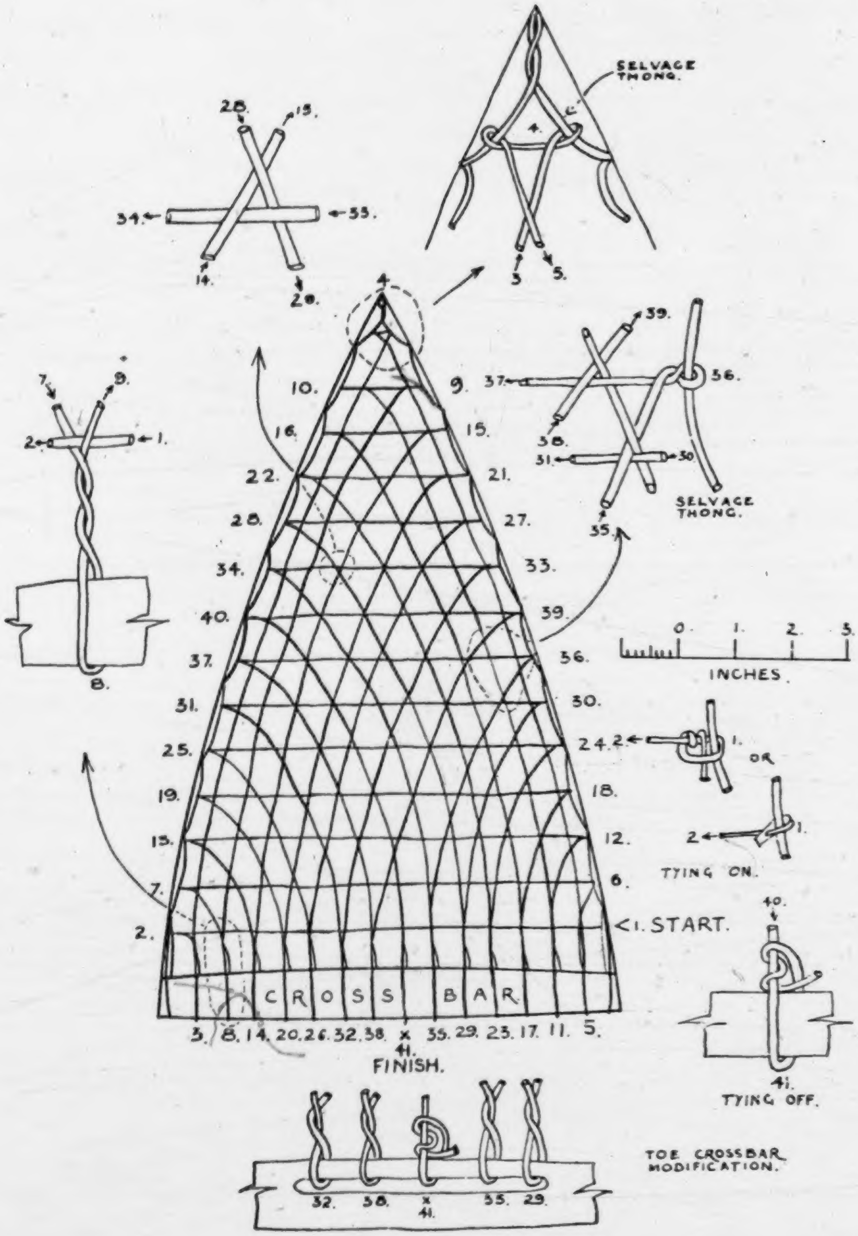
The skins from Loche, Brook trout and Sturgeon were used to fill the front and rear panels of the snowshoe (Honigman, 1956:29). The skin was peeled off the fish from tail to head, rather like the removal of a "T"-shirt. While still wet, it was cut in a continuous spiral. It apparently had the fineness of "stove pipe wire". It was twisted in loose spirals to make it stronger.

LACING THE SNOWSHOE

The Fox Lake Swampy Cree take a dry, prepared bundle of rawhide and let it soak in water for 24 hours. It is then removed and allowed to dry for a few minutes while the free water evaporates off. Lacing is then carried out without the use of a snowshoe needle. The lacing is of sufficient size, such that no problems are encountered when passing the hide through the appertures as they develop. The lacing patterns used are those shown in figures 41 and 42. Joining of the lacing is carried out using the eye and thread method. This entails making a longitudinal cut in the end of the length of material projecting from the weaving and the extension piece. Through the slitted lacing, projecting from the weaving, is pushed the slitted extension piece and its other end passed through its slit or eye. This is pulled tight and the lacing continued.

DECORATION AND FINISHING OF FRAMES AND LACING

The Swampy Cree have been known to use the dye from willow bark to stain their snowshoe lacing (Honigman, 1956: 28). It was prepared by first soaking the willow bark in water and then immersing the line in the resulting solution. The Fox Lake Cree treated their finished snowshoe by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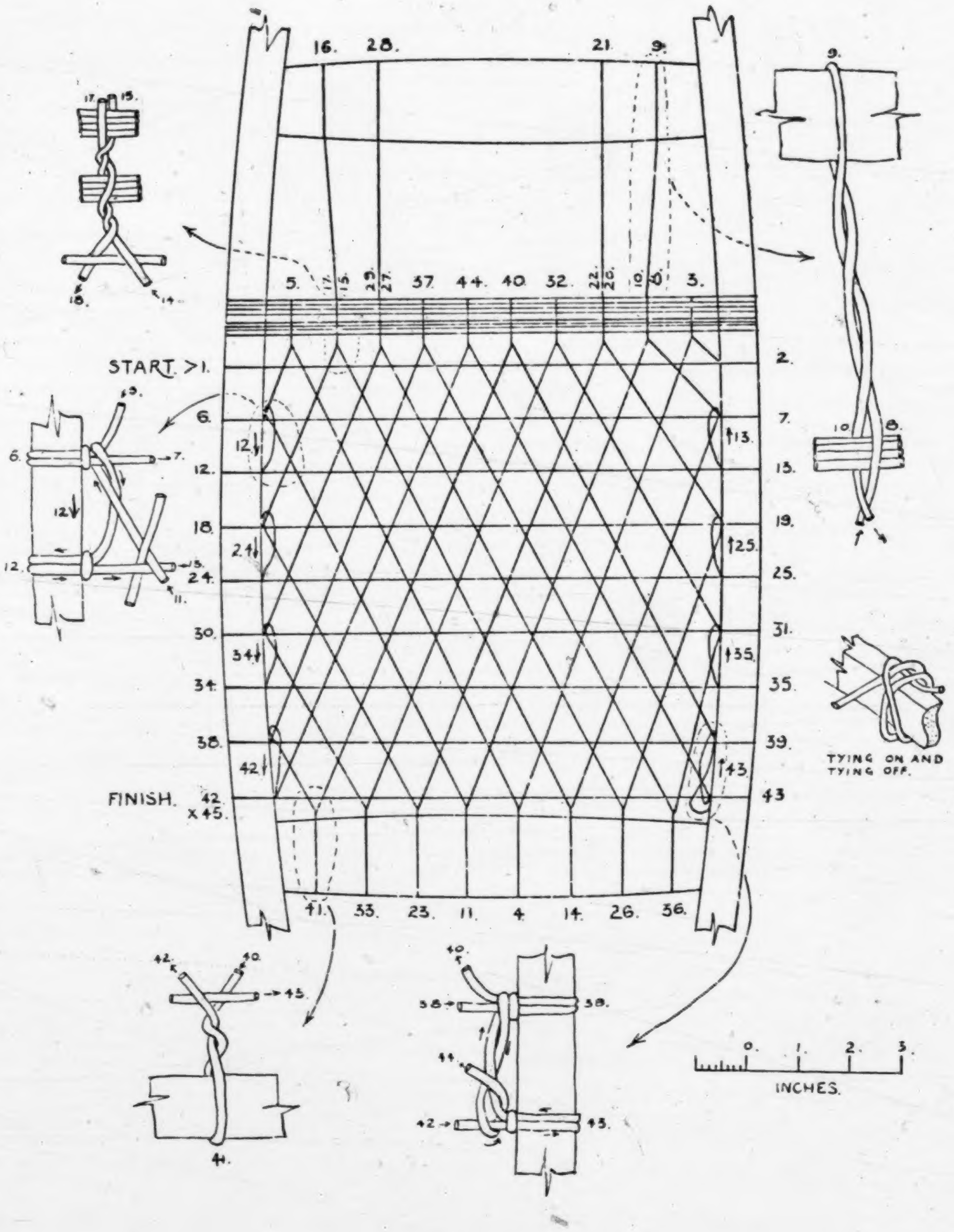
TOE CROSSBAR MODIFICATION.

Figure 41. Lacing pattern and details of front and rear sections of the Fox Lake snowshoe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INCHES.

Figure 42. Lacing pattern and details of the centre section of the Fox Lake snowshoe

immersing it in a ten gallon drum of linseed oil and allowing it to dry. This was repeated and on drying gave a yellow hue to the wood and lacing.

Chapter 6

SWAMPY CREE SNOWSHOE CHARACTERISTICS RELATED TO THE ENVIRONMENT

Introduction

Throughout this chapter a comparison of snowshoe components will be made with the contemporary traditional snowshoes as represented by the sample snowshoe taken from Fox Lake. The sample used is their average sized model and reflects the most common one in use. By using this as a means of comparison, the relative position of the Fox Lake snowshoe is ascertained within the samples of snowshoes. From this an indication is given of the validity of accepting the Fox Lake snowshoe as representative of traditional design. Due to the small sample of only 11 pairs of traditional snowshoes, no analysis of variance can be determined. Therefore the characteristics deduced are general and only apply to the sample group. The use of ratios to describe relationships between various components presumes that the basic design of a Swampy Cree snowshoe, related to the environmental conditions in which it is used, will have constant proportions.

Comparison of Ratios Between Basic Sizes (Table 3)

The range of snowshoe lengths is from 24 to 59 inches. Five pairs are larger than the Fox Lake pair at 51 inches, and 5 pairs are smaller. The range of widths

Accession Number	Date, area collected	Length	Width	Up-turn	Ratio width/length	Ratio upturn/length
1. Vancouver Centennial Museum # H973.302	1885 Fort Edmonton Alberta	24	5 1/4	3	1:4·57	1:8
2. Alberta Provincial Museum and Archives # 65.235.60	1931 Slave Lake, N.W.T.	28	6 1/4	4	1:4·48	1:7
3. Alberta Provincial Museum and Archives # 74.111.1A	1900 - 1914 Lesser Slave Lake, Alberta	59	11	9 1/2	1:5·36	1:62
4. Lower Fort Garry Selkirk, Manitoba # 2369	Hudson's Bay Company Trading Area	53 3/4	15	6 3/4	1:3·58	1:7·96
5. Lower Fort Garry Selkirk, Manitoba # 2370	Hudson's Bay Company Trading Area	57	15	8	1:3·8	1:7·13
6. Lower Fort Garry Selkirk, Manitoba # 2662	Hudson's Bay Company Trading Area	33	7 3/4	3 1/2	1:4·26	1:9·42
7. Lower Fort Garry Selkirk, Manitoba # 2376	Hudson's Bay Company Trading Area	42	8	6 1/2	1:5·25	1:6·46
8. Lower Fort Garry Selkirk, Manitoba # 2371	Hudson's Bay Company Trading Area	58 1/2	11 1/2	3 1/2	1:5·08	1:16·7
9. Lower Fort Garry Selkirk, Manitoba # 2663	1938 Hudson's Bay Company Trading Area	30	7 1/2	7	1:4·0	1:4·28
10. Lower Fort Garry Selkirk, Manitoba # 2372	Hudson's Bay Company Trading Area	55	11 1/2	6	1:4·78	1:9·17
11. Fox Creek Northern Alberta	1975	51	10	6	1:5·1	1:85

Table 3. Snowshoe accession numbers, dates, areas collected, basic sizes and basic ratio proportions

is from 5½ to 15 inches. Five pairs are larger than the Fox Lake pair at 10 inches and 5 pairs smaller. The ratios of width to length range from 1:3.58 to 1:5.36. These ratio limits are represented by snowshoes with lengths of 53 3/4 and 59 inches with maximum widths of 15 and 11 inches respectively. The Fox Lake snowshoes are represented by a ratio of 1:5.1 with eight pairs of snowshoes having ratios smaller and 2 pairs larger.

The upturn of the toe ranges from 3 to 9½ inches. Five pairs are larger than the Fox Lake pair at 6 inches, one pair is the same width at 6 inches and 4 pairs are smaller. The ratios of upturn to length range from 1:4.28 to 1:16.7. These ratio limits are represented by snowshoes of lengths 30 and 58½ inches with upturns of 7 and 3½ inches respectively. The Fox Lake snowshoes are represented by a ratio of 1:8.5 with seven pairs having smaller ratios and 3 pairs larger.

The Fox Lake snowshoes are in the middle of the sample in rank order when comparing their lengths and width. The ratio of width to length of the Fox Lake snowshoes at 1:51 indicates that they are narrower in relation to their width than 8 pairs of snowshoes. The upturn of the Fox Lake snowshoes at 6 inches is exactly midway between the tallest and shortest upturn at 9 and 3 inches respectively. The Fox Lake ratio of upturn to length of 1:8.5 indicates that they are lower in relation to their length than 7 pairs of snowshoes.

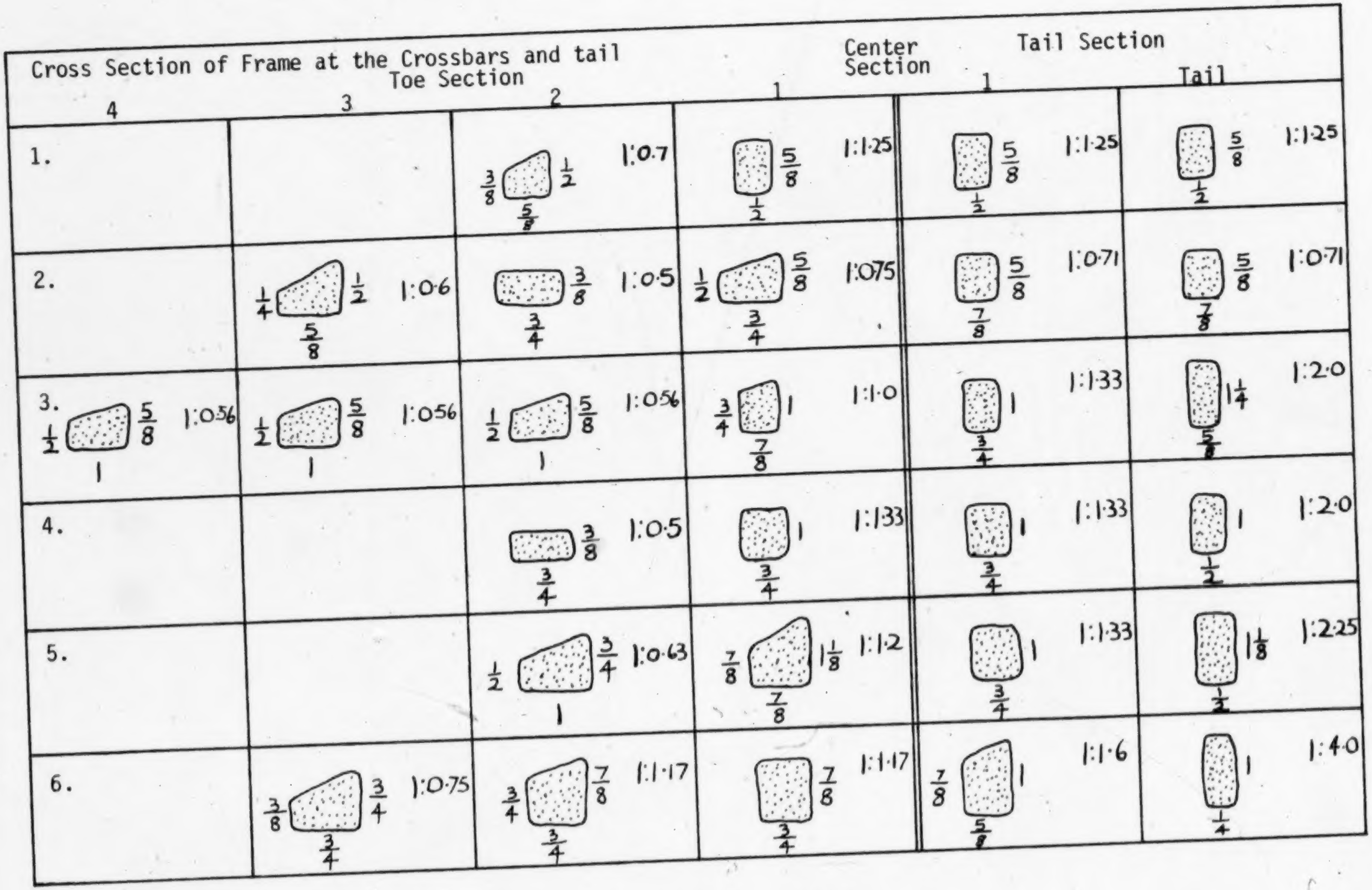
Comparison of Frame Cross Sections and Ratios (Table 4 and 5)

The frame represents the main constructional unit to which the other units are fastened to make up the snowshoe. It therefore has to be designed to withstand the pressures on it as a person stands on the center section. The great variety of snow conditions offer an ever changing challenge to its structural components.

For this comparison the ratio of the horizontal dimension to the vertical dimension is calculated at the point where a crossbar is inserted into the frame. Where the toe or tail cross section has an asymmetrical vertical axis, the sum of the two sides is added and averaged out to give a height for the ratio calculation.

Out of the 11 pairs of snowshoes 9, including the Fox Lake pair, have increasing ratios between the width to height if the comparison is started at the toe and continued to the tail. This indicates that the height is increasing in proportion to the width, the further back the measurements are taken. The two samples which do not exactly follow this trend are sample number 2 and 8 which deviate only slightly from the previous statement. In sample number 2 the toe crossbar ratio is larger than the tail,and in number 8 the heel crossbar ratio is larger than the tail ratio.

The point at which the cross section changes to or has already changed to a tall, vertical cross section of



Cross Section of Frame at the Crossbars and tail	Toe Section			Center Section	Tail Section	
	4	3	2	1	1	Tail
1.			3/8 1/2 5/8 1:0·7	5/8 1/2 1:1·25	5/8 1/2 1:1·25	5/8 1/2 1:1·25
2.		1/4 1/2 5/8 1:0·6	3/8 3/4 1:0·5	1/2 5/8 3/4 1:0·75	5/8 7/8 1:0·71	5/8 7/8 1:0·71
3.	1/2 5/8 1 1:0·56	1/2 5/8 1 1:0·56	1/2 5/8 1 1:0·56	3/4 1 7/8 1:1·0	1 3/4 1:1·33	1 1/4 5/8 1:2·0
4.			3/8 3/4 1:0·5	1 3/4 1:1·33	1 3/4 1:1·33	1 1/2 1:2·0
5.			1/2 3/4 1 1:0·63	7/8 1 1/8 7/8 1:1·2	1 3/4 1:1·33	1 1/8 1/2 1:2·25
6.		3/8 3/4 3/4 1:0·75	3/4 7/8 3/4 1:1·17	7/8 3/4 1:1·17	7/8 1 5/8 1:1·6	1 1/4 1:4·0

Table 4. Cross sections of frame at the crossbars

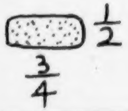
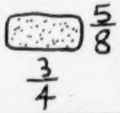
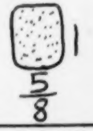
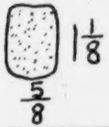
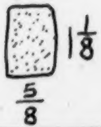
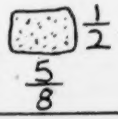
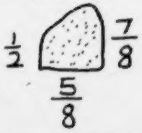
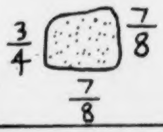
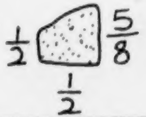
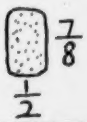
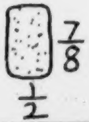
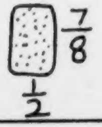
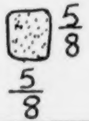
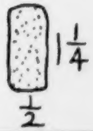
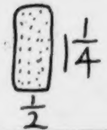
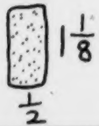
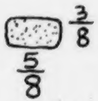
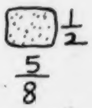
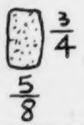
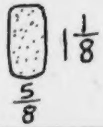
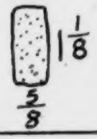
Cross Section of Frame at the Crossbars and Tail					
Toe Section			Center Section	Tail Section	
4	3	2	1	1	Tail
7.	 1:0·66	 1:0·83	 1:1·6	 1:1·8	 1:1·8
8.			 1:0·8	 1:1·1	 1:0·93
9.		 1:1·12	 1:1·75	 1:1·75	 1:1·75
10.		 1:1·0	 1:25	 1:2·5	 1:2·25
11.	 1:0·6	 1:0·8	 1:1·2	 1:1·8	 1:1·8

Table 5. Cross sections of frame at the crossbars

greater than 1:1 is at the first toe cross section where the toe crossbar enters the frame. Nine samples out of the 11 conform to this pattern. Snowshoe samples number 2 and 8 do not conform, although sample 2 shows the largest ratio of any of its 5 measured cross sections at the first toe crossbar, and sample number 8 shows this at the first tail cross section.

The Fox Lake snowshoe exhibits the increasing ratio between the width to height with ratios of 1:0.6, 1:0.8, 1:1.2 in the toe section of the snowshoe and 1:1.8, 1:1.18 in the tail section. It therefore conforms to the pattern as shown by 8, or 9, if you consider the Fox Lake pair, out of 11 pairs.

The significance of the increasing ratio from toe to tail is that the toe section has a flat horizontal cross section which changes to a tall, vertical cross section towards the tail. This has an effect on the construction and performance of the snowshoe which are detailed below.

Effect of Variable Cross Sectional Ratios on Construction

The major constructional technique involved in the frame is that of bending. The material being bent is birch. Birch does not have the bending characteristics of ash or other easily bent woods, so a compromise is needed to form it. This is achieved by reducing the vertical cross sectional thickness of the upturned toe. Without this thinning, compression and expansion fractures occur on the inside and outside of the curve, making the frame exceptionally weak or useless. In spite of the use of this constructional technique at Fox Lake, the writer has observed a number of broken frames which have had to be discarded.

The taller, vertical cross section allows for easier lateral bending when the snowshoe frame curves are formed. No broken frames have been observed when this constructional technique is used at Fox Lake.

The narrower, horizontal and taller, vertical cross section provides ample strength to allow horizontal drilling of holes to take the selvage thongs. This cross section also allows for sufficient room in which to cut the mortice to take the tenon. If not enough material is left above or below the mortice, then the cross section is effectively reduced to the amount of material left between the bottom of the mortice and the outside of the frame. It is worth noting that samples number 2 and 8 do not possess a tall, vertical cross section at the first cross section of the toe section like the other 9 pairs. Over all the two pairs have a flatter frame cross section than the other 9 pairs. The other 9 pairs possess ratios at the first toe and tail crossbars which are greater than 1:1.1. This provides a strong frame cross section to take the toe and tail crossbars which, with the frame, are the load-bearing units for the centre section lacing.

Effect of Variable Cross Sectional Ratios on Snowshoe Performance

The flatter, horizontal toe cross section allows greater vertical flexibility when used on snow. The flexible toe allows the snowshoe to accommodate moderate discrepancies in terrain caused by varying snow densities and obstructions lying on or in the snow.

The taller, vertical cross section of the centre and tail section provides for structural strength and rigidity at a minimum of weight. This is akin to the structural strength achieved with floor joists. With the greater rigidity of the tail and centre sections there is a performance characteristic which is similar to wooden cross country skis. This characteristic takes the form of strong tail and center sections and relatively weak toes of either oversnow device. This creates a forward spring which considerably assists the forward movement of the user.

The last two points are interrelated. The taller, vertical cross sections penetrate and grip the snow surface to give lateral stability on slopes. This greater vertical cross section also raises the lacing above the imaginary line drawn across the bottom of the frame sides. This allows for a greater flexing of the lacing which will contribute to forward spring. The action of the snowshoes on a hard side slope is for the toe section to swing around.

This is because the foot is pivoted forward of the snowshoe balance point and the flatter toe frame cross section does not dig in.

Decoration, Frame Fastening and Selvage Thong Attachment (Tables 6,7)

Decorations. The materials used in all the samples but one are birch. The exception is sample number 4 which uses ash. Two pairs of snowshoes, number 3 and 11, are finished with oil, in the latter case this is linseed oil. Three pairs, number 2, 6 and 9 are finished with paint. Six pairs of snowshoes make use of tufts of bright wool of any one or combination of green, red and blue, which are fastened under the selvage thong on the outside. The Fox Lake snowshoe is not decorated in any manner but is dipped in linseed oil which gives it a golden yellow hue..

Frame fastening (Tables 6,7). The toe and tail differ in their functions within the overall concept of the snowshoe. The tail is a strong, relatively rigid unit which, because of its tall vertical cross section, prevents twisting. The toe is a floating flexible unit, always moving, as it takes up the contours of the varying snow conditions.

These two functions govern the fastening characteristics of the snowshoe. The tail is rigidly fastened in 6 cases out of the 11 samples with a clinched nail, or screw, or its equivalent, e.g. a copper rivet and washer. The other 5 samples used drilled holes threaded with lacing

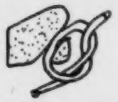
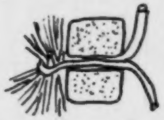
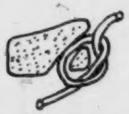
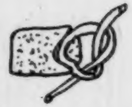
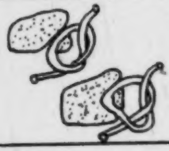
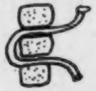
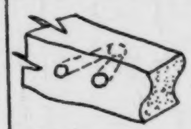
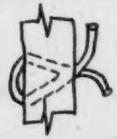
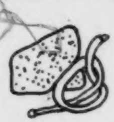
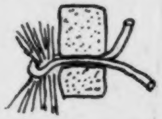
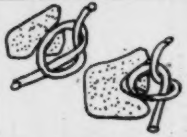
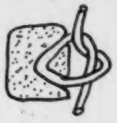
Material	Joining of toe and tail	Finish on frame and Crossbars	Selvage thong attachment to frame		Other points
			Toe	Tail	
1. Birch	Toe Notched Tail Drilled Both tied with lacing	Blue and red wool retaining bobbles on selvage thong			Outside of birch tree, including inner bark, was on bottom of SS. Frames matched and tied with string at toe curve and tail.
2. Birch	Toe Notched Tail Drilled and pegged Both tied with lacing	Green paint			Frames matched and tied with string at toe curve and tail.
3. Birch	Toe Clinched nails Tail Clinched nail and tied with lacing	Dark oil			Compression fractures on inside of curve. Wood planed flat. Made by H.B.C. employee.
4. Ash	Toe Notched Tail Screwed and filed off. Tied with lacing.	Tufts of red wool inside selvage thong on outside.			Two holes converge to single hole on inside of frame. A wooden peg driven into selvage thong hole holds it, no tying off needed.
5. Birch	Toe Tail Both drilled and laced.	Yellow, red and blue bobbles of wool on outside of frame.			Heavy cloth covering was used in center section of frame to prevent chaffing of rawhide.
6. Birch	Toe Notched and laced Tail Drilled and laced	Green, red, white and orange alternating diagonal stripes.			

Table 6. Toe and tail fastening of frame, selvage thong attachment to frame and miscellaneous points

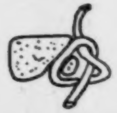
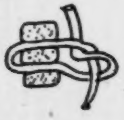
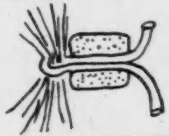
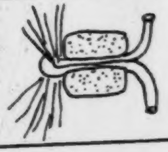
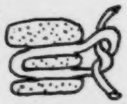
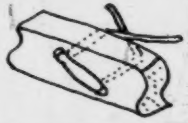
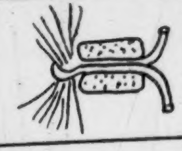
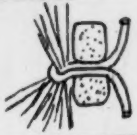
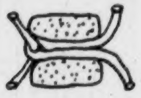
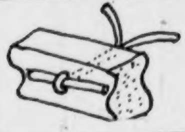
Material	Joining of toe and tail	Finish on frame and Crossbars	Selvage thong attachment to frame		Other points
			Toe	Tail	
7. Birch	Toe Laced and nail stapled Tail Clinched nails	Red and blue wool tassles			Outside of birch tree, including inner bark, was on bottom of SS. Lacing wrapped around pin striped cotton on frame.
8. Birch	Toe Notched and laced Tail Drilled and laced	Rolled red stroud cloth inside selvage thong on outside.			A tensioning lace is used to hold up the toe and prevent it from flattening out.
9. Birch	Toe Notched and brass wire Tail Wrapped around brass wire clinched copper nail.	Green paint all over			Red stroud cloth wrapped around frame center section. Two holes for selvage thong are joined by recessed groove on outside.
10. Birch	Toe Notched and laced with brass wire Tail Drilled and laced clinched nail.	Tufts of green and red wool inside selvage thong on outside.			Black cloth wrapped around frame center section.
11. Birch	Toe Notched and laced Tail Copper rivet and washer	Linseed oil			Outside of birch tree, including inner bark, was on bottom of Snowshoe.

Table 7. Toe and tail fastening of frame, selvage thong attachment to frame and miscellaneous points

which is bound tightly around the frame.

The toe is fastened in 9 samples out of 11 by the toe frame being notched to take the rawhide lacing. It is bound tightly but nevertheless allows some room for movement. In the other two samples the toe is laced with vertical holes and bound with lacing.

The Fox Lake snowshoes use the copper rivet and washer, a rigid tail fastening system which conforms to a total of 6 samples out of the 11. The toe is notched and laced which conformed to 9 samples out of the 11.

Selvage thong attachment. The reason for the preference of having a selvage thong is it saves wear and tear on the lacing. The alternative is to have the lacing bound around the frame which adds weight to the total snowshoe. A variety of methods is used to attach the selvage thong to the frame. This takes two forms. The first is to drill one hole and pass the lacing through both ways and prevent it from being pulled through by inserting material in the loop so made. The second is to pass the lacing through two holes, one outgoing from the center and the other ingoing. The wood so encircled gives the necessary support.

The least common method used to hold the selvage thong is the single hole method. This is used on the toe and tail section of snowshoe samples 10 and 8 and on the tail sections only of samples 1 and 5. Rolled up stroud or wool tufts are used as retaining materials. The

Fox Lake snowshoes use a retaining piece of lacing to prevent the selvage thong from being pulled through. This requires a piece of lacing to be run down the entire length of each side of the toe and tail sections (Figs. 35,36).

In the second method of fastening 8 out of 11 samples at the toe pass the selvage thong through and around the frame and then are tied off with a half hitch. The holes drilled for this go diagonally through the lower inside edge of the frame in all samples, except for two. Sample number 4 has two holes drilled in a lateral plane which converges on the inside in one hole. The selvage thong is not tied in a half hitch. Sample number 9 has the holes drilled horizontally through the frame but not directly above each other. The selvage thong is then tied off in a half hitch.

The tail section shows a wide variety of methods of fastening the selvage thongs. With the greater vertical dimension and subsequent increase in strength afforded to the tail, more samples have pairs of holes drilled for the selvage thong. A departure from the previously described methods is the drilling of two holes from the inside of the frame. These meet diagonally within the snowshoe frame. The advantage afforded is that the selvage thong is not exposed in any way and therefore receives less wear. A half hitch is applied to the selvage thong as it comes out of the frame. Samples number 2 and 6 show these

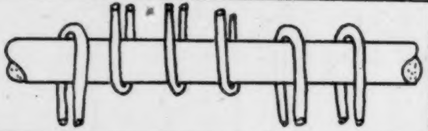
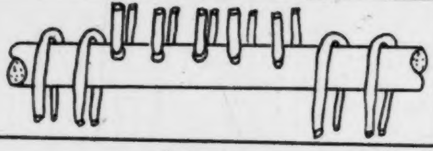
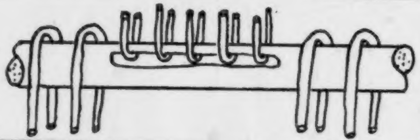
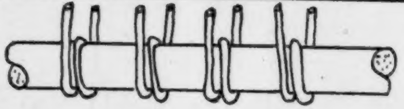
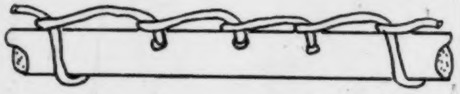
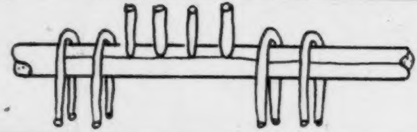
Material	Attachment of Selvage thong to Front Crossbar	# of wood XBars	# of hide XBars	Cross section of X Bars, Method of fastening to frame M=Mortice & Tenon D=Drilled, incl. angle through frame 4	3	2	1	1	2
1. Birch		3	0			1/4 3/8 M	3/8 5/8 M	3/8 3/4 M	
2. Birch		3	0		5/8 1/4 1/2 x2 D	1/4 3/4 M	3/8 1 M	1/4 1 M	
3. Birch		5	1	1 3/8 5/8 x4 D	3/8 3/8 D	1/2 1/2 D	7/8 1/4 1/4 1/2 1 3/8 M	1/2 1 1/4 M	3/8 1/2 M
4. Ash		2	1			3/4 3/8 x4 D	5/8 1 1/8 M	5/8 1 M	
5. Birch		2	1			1 1/2 3/4 x2 D	3/4 1 M	3/4 1 1/8 M	
6. Birch		3	1		3/4 3/8 3/4 x2 D	1/2 1/4 M	1 3/16 1/4 1 1/4 M	1/4 1 M	

Table 8. Selvage thong attachment to front crossbar, numbers of crossbars, crossbar attachment to the frame and cross section of crossbars.

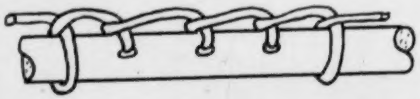
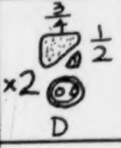
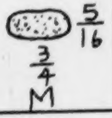
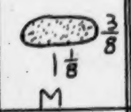
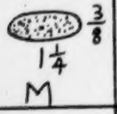
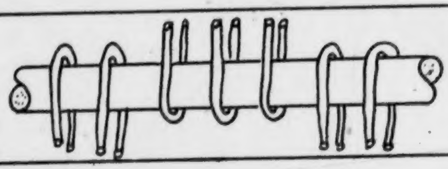
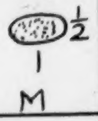
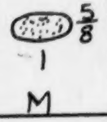
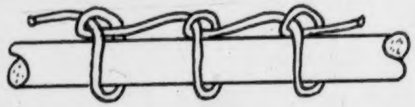
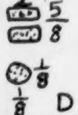
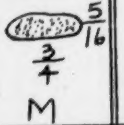
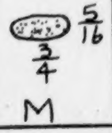
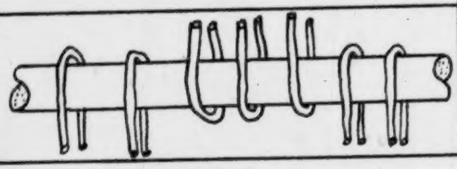
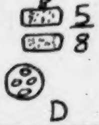
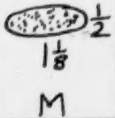
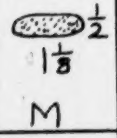
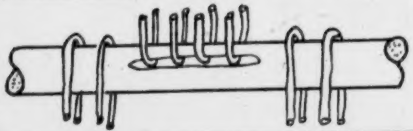
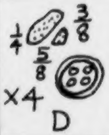
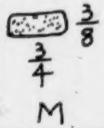
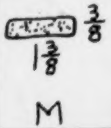
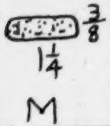
Material	Attachment of Selvage thong to Front Crossbar	# of wood XBars	# of hide XBars	Cross Section of X Bars. Method of fastening to frame M=Mortice & Tenon D=Drilled, incl.angle through frame					
				4	3	2	1	1	2
7. Birch		3	1		 $\frac{3}{4}$ $\frac{1}{2}$ ×2 D	 $\frac{5}{16}$ $\frac{3}{4}$ M	 $\frac{3}{8}$ $1\frac{1}{8}$ M	 $\frac{3}{8}$ $1\frac{1}{4}$ M	
8. Birch		2	1				 $\frac{1}{2}$ 1 M	 $\frac{5}{8}$ 1 M	
9. Birch		2	1			 $\frac{1}{2}$ $\frac{5}{8}$ $\frac{1}{8}$ $\frac{1}{8}$ D	 $\frac{5}{16}$ $\frac{3}{4}$ M	 $\frac{5}{16}$ $\frac{3}{4}$ M	
10. Birch		2	1			 $\frac{5}{8}$ $\frac{5}{8}$ D	 $\frac{1}{2}$ $1\frac{1}{8}$ M	 $\frac{1}{2}$ $1\frac{1}{8}$ M	
11. Birch		3	1		 $\frac{1}{4}$ $\frac{3}{8}$ $\frac{5}{8}$ ×4 D	 $\frac{3}{8}$ $\frac{3}{4}$ M	 $\frac{3}{8}$ $1\frac{3}{8}$ M	 $\frac{3}{8}$ $1\frac{1}{4}$ M	

Table 9. Selvage thong attachment to front crossbar, number and types of crossbars, crossbar attachment to the frame and cross section of crossbars

characteristics.

Miscellaneous points. It is observed on 3 samples (numbers 1, 7 and 11), including the Fox Lake sample, that the cambium layer of bark is allowed to remain on the lower underside of the toe curve.

Two samples, numbers 1 and 2, both have evidence of being tied together at the tail and the beginning of the toe curve. This is shown by the rounding of the corners at these points and by the imprint of corded rope. The Fox Lake snowshoes are tied at these points while they are having their upturn put into them.

Selvage Thong Attachment and the Crossbars (Tables 8 and 9)

Introduction. Without the crossbar the Swampy Cree snowshoe cannot be constructed (Davidson, 1937:51). This becomes evident if you can conceive of treading on the netting of the Swampy Cree snowshoe frame without crossbars. The frame will close in around the ankle as the foot sinks deeper into the snow. The function of the crossbars is to hold the frame apart. This is correct for the crossbars in front of and behind the foot which are the most important structurally. They take the load of the body weight from the lacing and the compressive forces of the frames as they are pulled in by the tightening lacing. All the crossbars use the mortice and tenon techniques of attachment to the frame, except for the case of sample number 3 which uses drilled holes to take its auxilliary second and third toe crossbars.

Auxilliary crossbars, as named by the writer, are also inserted where the length of the frame bows inwards from snow pressure on the weaving. Their other function which is specifically important in the toe section, is to prevent the forcing in of the lacing by the snow pack.

A third type of crossbar made of lacing is used which acts on the frame in an opposing function, compared to the wood crossbar. The writer calls it a multiple tension support and notes that it is used to maintain the position of the frame at the upturn and to keep in tension the frames so that the auxilliary crossbars do not fall out with the movement and flexibility built into the snowshoe toe.

Crossbars. All crossbars are made of the same material as their frames. One snowshoe sample, number 3, has two crossbars in the tail section, all others have one which is commonly known as the heel crossbar. It is interesting to note that this sample is also the longest with the highest upturn in the oollection of 11 samples. It is 59 inches long and 9½ inches tall in the upturn.

The number of crossbars contained in the toe section varies widely from 4 to the mandatory 1. This latter case is represented by sample number 8. In 9 out of 11 samples the multiple tension support is used at the toe. The 2 samples not using this are numbers 1 and 8. In 8 out of the 9 samples a fine cross section lacing is used with sample number 9 using brass snare wire. Six of the samples using the multiple tension support have the frame drilled diagonally through the lower inside edge. The other 3 samples are drilled either vertically or horizontally, depending upon which axis can take a drilled hole without seriously weakening the frame.

The first crossbar cross section of the toe and tail of all snowshoes exhibits a greater horizontal component, compared with the vertical. This supplies the necessary strength to resist lateral pull from the centre section when the lacing is weighted by its user. The forces applied by the frames being pulled in can be resisted by the crossbar being in any position, just so long as it can withstand the inward compressive pressure.

The auxilliary crossbars all show a greater horizontal component compared with the vertical, except for specimen number 3. This has two birch dowels of 3/8 and ½ inch in diameter.

The multiple tension supports vary in the number of times that they are stretched across the frame. Four samples use 4 strands of fine lacing and 4 samples use 2 strands of lacing. The ninth sample uses wire. The Fox Lake snowshoes use 4 strands of lacing for this function. Sample number 8 is listed in the column headed

"# of hide X Bars" as having a multiple tensioning support. This takes the form of a piece of lacing stretching from the front crossbar to the toe section. This appears to have the function of holding up the toe and also of holding in the frame at the toe.

Selvage thong attachment. The selvage thong attachment to the front crossbar has an important bearing on the life of the lacing at that point. There is a tendency for the foot to slip forward in the binding and for the toe to rub against the front crossbar. This causes wear on any lacing which exists there. To overcome this problem the selvage thong, or toe lacing in some cases, is fixed to the crossbar, so it does not go completely around it.

Six pairs of snowshoes out of the 11 samples leave the front crossbar free of any lacing in the area immediately in front of the toe hole in the lacing of the centre section. The other 5 pairs make no effort to reduce the wear. Three samples solve the problem by drilling holes in the front crossbar. Two of these thread the selvage thong through the crossbar and the third has the lacing threaded directly through it. One sample, number 6, solves this problem by splitting the crossbar in two and threading the toe lacing through it as needed. For the remaining 2 samples, which include the Fox Lake pair, the problem is solved by cutting a narrow ¼ inch wide slot immediately in front of the toe hole of the centre lacing. The lacing is threaded directly through this slot.

Lacing (Table 10)

Introduction. The lacing is an integral part of the snowshoe structure. It provides the necessary tension to pull in and hold the frame in position to maintain the crossbar tenons in their mortices. It is the structure of the snowshoe offering resistance to the snow which is packed down and consolidated by its area. This consolidation provides the necessary snow density reciprocal to the weight of the snowshoer. The hexagonal weaving provides a textured surface for gripping the snow. It is made up of lacing running at right angles and 60° to the toe and tail axis. Throughout the snowshoe area there are inumerable points where the lacing goes under and therefore projects down towards the snow. In doing so it bites into and grips the snow, giving traction for forward or backward movements.

Material. There is a structural difference between the lacing used in the toe and tail sections and that used in the centre. The centre lacing needs to be strong to bear the weight of the user while the toe and tail, still bearing some body weight, has a flotation function. With this disparity a wide variety of materials are used. The stronger, thicker material for the centre section is definitely moose hide in 4 samples, with it possibly being the material used in one other sample. A finer rawhide is also used in many cases for the centre section, but the origin

Material	Width of lace			Weaving Type			No. of holes over 2 inches			Method of lengthening lace	Other points
	F	C	R	F	C	R	F	C	R		
1. Deer	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{16}$	H	H	H	11	7	11	Square knots	
2. Moose	$\frac{1}{16}$	$\frac{1}{8}\times\frac{1}{16}$	$\frac{1}{16}$	H	H	H	5	5	6	-	Green paint applied to rawhide
3. Deer or Moose	$\frac{1}{8}\times\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{16}\times\frac{1}{32}$	H	H	H	5	4	7	Square knots	
4. String Moosehide String	$\frac{1}{16}$	$\frac{1}{8}\times\frac{1}{16}$	$\frac{1}{16}$	H	H	H	4	3	5	Square knots	
5. Deer	$\frac{1}{16}\times\frac{1}{32}$	$\frac{1}{8}\times\frac{1}{16}$	$\frac{1}{16}\times\frac{1}{32}$	H	H	H	6	4	8	Square knots, eye and thread	Patterned lacing under the foot in center panel affords better weaving.
6. Deer or Caribou	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{16}$	H	H	H	9	5	9	Square knots	Alternating diagonal stripes of green,red and orange paint.
7. String Moosehide String	$\frac{1}{32}$	$\frac{3}{16}\times\frac{1}{16}$	$\frac{1}{32}$	H	H	H	12	6	11	Square knots, eye and thread	
8. Deer or Caribou	$\frac{3}{16}\times\frac{1}{8}$	$\frac{3}{16}\times\frac{1}{8}$	$\frac{3}{16}\times\frac{1}{8}$	H	H	H	3	3	3	Square knots, eye and thread	
9. —	$\frac{1}{32}\times\frac{1}{32}$	$\frac{1}{8}\times\frac{1}{32}$	$\frac{1}{32}\times\frac{1}{32}$	H	H	H	9	5	9	Square knots, eye and thread	
10. Caribou, deer tanned moose-hide,bootlaces	$\frac{1}{16}\times\frac{1}{32}$	$\frac{1}{8}\times\frac{1}{16}$	$\frac{1}{16}\times\frac{1}{32}$	H	H	H	4	4	4	Square knots	Random weaving repair.
11. Cowhide	$\frac{1}{8}\times\frac{1}{16}$	$\frac{1}{4}\times\frac{1}{8}$	$\frac{1}{8}\times\frac{1}{16}$	H	H	H	4	3	4	Square knots	

Table 10. Lacing material, sizes, methods of lengthening and miscellaneous points

of this material is often difficult to distinguish when no stray hairs of the animal are left attached. The toe and tail sections are always of finer material, including in some cases leather bootlaces. The Fox Lake snowshoes use cowhide for lacing because it is not possible nor wise to hunt game animals for the quantity of rawhide required. The relative sizes of the lacing in each section is clearly shown in Table 8. In 10 samples out of the 11 the centre section lacing is larger than the toe and tail, and in the eleventh sample, number 8, it is exactly the same in size in all three sections.

Lengthening lacing. Two methods are used for joining lengths of lacing. These are the use of square knots, also known as the reef knot. The other method used is the eye and thread method.

The slit and eye method is used where the lacing is wide enough, e.g. in the centre panels. Where the lacing is narrow, the square knot is used, e.g. samples number 1 and 4. Sample number 2 shows no evidence of lengthening lacing that the writer can detect. An interesting method for tying off the lacing is shown in sample number 4 which has the lacing pass through a hole which is then plugged tight with a small wooden wedge, cut off flush with the surface.

All centre sections of the snowshoes use the wrap around method of fastening the lacing to the frame. This entails wrapping the lacing around the frame with no resort to the use of selvage thongs. Selvage thongs are far too weak to withstand any pressure as great as that excerted by body weighting. To alleviate some of the stress at the corners of the frame 4 samples are wrapped around with cloth, either of cotton or stroud, prior to the commencement of lacing (samples 5, 7, 9 and 10).

Weaving patterns. The method of weaving the lacing is the hexagonal pattern. This is used in all cases without exception. What variation exists is in the fineness of the weave. This is measured over a lateral 2 inch span from the side of one hexagonal pattern to another. A means of comparing the fineness between the snowshoe samples is to add up the number of hexagonal holes which appear in the toe, centre, and tail sections. This figure is then taken as representing the composite fineness of the weaving in that snowshoe sample. With these results the writer finds that 4 out of 5 snowshoe samples less than 51 inches in length (numbers 1, 6, 7 and 9) have composite fineness figures ranging from 23 to 29. Sample number 2 has a figure of 16. The other 6 samples, all longer than 51 inches (numbers 3, 4, 5, 8, 10 and 11) have composite fineness figures ranging from 9 to 18. The Fox Lake snowshoe sample has a composite fineness figure of 11. From these figures it appears that the smaller the snowshoe, the finer the weaving pattern. Conversely the larger the snowshoe, the larger the pattern.

Chapter 7

THE IMPACT OF CHANGING TECHNOLOGIES ON HANDCRAFTING TRADITIONAL SWAMPY CREE SNOWSHOES

Introduction

To begin this discussion it is worthwhile to refresh our memories regarding the definition of technology. It has been defined in this thesis as "encompassing a group of techniques relating to a particular manufacturing skill or way of performing a series of manipulative activities with tools on materials". (Page 19). From this can be drawn three components which are involved in making up a technology. The first encompasses the tools which do the actual physical shaping and cutting. The second is the material which is being worked on and manipulated. The third is the manner in which the individual using the tools and materials perceives the problem at hand and solves it with a series of hand manipulations called techniques.

These three contributory components which make up a technology will all be changing as the availability or lack of materials, or tools, and the discovery and lapsing into disuse or forgetting of various techniques, juxtapose with each other. Influences on the technology to increase its efficiency or to change it as a matter of preference will come from either external or internal sources.

In the context of handcrafting traditional Swampy

Cree snowshoes discussion cannot be offered directly on the impact of changing technologies. The reason is that the writer has been unable to locate specimens of authenticated Swampy Cree snowshoes which date from the start of this study period. It is unlikely that any exist due to their fragile nature and the time span involved. However, some written information is available. The eleven specimens of snowshoes which have been examined by the writer will reflect the impact of changing technologies of the years from 1885 to the present 1975. It is noted that this sample of representative snowshoes is small.

The Introduction of Metals to the Swampy Cree

Honigman (1956:27) notes that the Indians living around the point identified as Fort Severn did not trade in or possess native copper implements or copper artifacts. However, Blair (1911:173,174) states the Ottawa Indians traded their worn out tools and cooking implements to the Swampy Cree in exchange for beaver pelts. The Ottawa Indians were supplied by the French traders based in Montreal. It is therefore likely that some of the Swampy Cree peoples were familiar with the properties of metals prior to the direct contact with the Hudson's Bay Company Representatives in 1671. They would also be familiar with the repair and maintenance of these tools and have had some knowledge of recycling materials.

During this period of time when worn out steel goods were being used and at subsequent times, (Honigman, 1956: 26) there co-existed two technologies, stone and steel. Honigman (1956:27) notes that the stone and bone tools of the Swampy Cree probably represented considerable efficiency. Stone was used for heavier work and bone was used for more delicate and precise construction functions. Clark (1976: 2) concurs with Honigman that precise detail could be achieved with simple tools and says

> it hardly is necessary to be concerned about detailed accurate cutting in the context of stone tool bit recovery in as much as seemingly simple stone implements would have been fitted into a variety of hafts. Accuracy would be achieved through manual dexterity...

Jenness (1955:38) however, brings in the element of time in efficiency and states

> Neither chipped nor polished stone implements, however, are as efficient as steel tools for cutting wood and bone; and the making of a wooden bowl, a horn spoon, or any of the implements and utensils necessary for the home, involved an amount of labour that Europeans, accustomed to machine-made products, would consider altogether out of proportion to the results achieved.

In terms of the Swampy Cree having to acquire manipulative skills, there would appear to be a high degree of transference of skills among a number of basic tools. The stone axe was followed by the steel and required the same leverage to be exerted on the handle to achieve the speed necessary for cutting of the wood fibres. In a similar fashion,when the axe became blunt,it can be assumed that the resharpening of it would have presented no problems since the Swampy Cree were familiar with the process of grinding stone to a sharp edge (Skinner, 1911: 52). It is a small step to transfer this skill from stone to steel.

The transfer of manipulative skills from the curved stone blades, which could have been hafted (Clarke, 1976:1),to the steel curved blade of the crooked knife would have been almost complete,and,as Clarke says (1976:2),

> Accuracy would be achieved through manual dexterity and haft design, without the bit component itself necessarily being an elegantly prepared piece.

Similarly the more distant analog of the beaver tooth or pair of teeth mounted transversely or obliquely on a wooden handle could have been used with considerable dexterity.

The efficiency and practicality of using awls, made from caribou horn (Honigman, 1956:26,27), in drilling wood was not great, for they had the disadvantage of being weak and breaking. Similarly the limitations placed on the beaver tooth drill when drilling in wood were high, for they too would break. The manipulative skills required were the simple twisting movement of the hand and wrist. When steel awls were available, there was a direct transference of skills and undoubted increase in efficiency.

The influence exerted by changing technologies on the tools used by the Swampy Cree women were varied. The women's knife with its flat, straight blade was more efficient in many respects than its stone or bone counterparts and represented less bulk and weight in proportion to its size. The use of steel as a scraper in preparing hides represented a number of advantages which must have been quickly seen by the Swampy Cree women. It was used as a trade item at least as early as 1682 (Rich, 1946:53) and commanded a relatively high price in "made beaver", compared with its cost to manufacture. Prior to its use the hair on the hide would be allowed to "slip" or was shaved or rubbed off with beamers. With the scraper the hide could be worked on before it became offensively odoriferous and represented considerable saving of both time and labour. This was indicated by the speed at which the Swampy Cree ladies at Fox Lake scrape clean a large cowhide which takes less than 1½ hours to prepare.

The use of steel in the fleshing tool appeared not to be used, it must be assumed, because the steel was not as efficient as bone. It also had the serious limitation of rusting when it came into contact with free water and fluids. The writer has come across one steel flesher example which was used by the Cree of the Onion Lake Reserve, Saskatchewan (Accession number 76-8-AP211, Glenbow Museum, Calgary). It was collected in 1976, so was probably in use during the study period. It is made from a piece of steel 1 inch conduit pipe which is flattened out and serrated along its leading edge.

The snowshoe needle is used in conjunction with lacing which has to be soaked in water before use. Consequently the snowshoe needle is made from bone and not steel which would rust. It is not an essential tool in lacing, but in fine weaving it is a definite advantage. The writer has observed only one metal snowshoe needle, but that was made from aluminum, a material not available until comparatively recently (Factory of Gros Louis, Lorretteville, Quebec, 1976). The Fox Lake Cree do not use a snowshoe needle.

The Influence of Tools and Materials Brought in by the Hudson's Bay Company

With the advent of the Hudson's Bay Company representatives, in the area of the same name in 1671, a constant source of all types of steel goods were available to the Swampy Cree. The directors of the Hudson's Bay Company were well aware of what the natives of North America desired the most and were therefore well stocked for their needs. This was because Groseilliers and Radisson had been instrumental in launching this trading project and had the experience of having travelled widely in North America and knew in detail the fur trading system (Rich, 1958:24). Consequently the tools that were brought over were similar, if not the same, (Rich, 1942:58,59) as those which the Swampy Cree had been trading with the Ottawas (Blair, 1911: 173,174) and had come from France. The impact was that large quantities of steel tools were available to the Swampy Cree at their cost of trapping beaver. As the standard of

"Made Beaver" indicates (Woodward, 1948:5), it took few pelts to equip a person with a basic unit of tools.

The impact of European tools and techniques on traditional snowshoe construction would have been negligible for they were devised for use at one location and were not related to the nomadic Swampy Cree life style. The Swampy Cree had their equivalent tools, but these were modified greatly to reflect their technological gifts and needs. The best example of this would be the difference between the drawknife and the crooked knife, which performed the same functions in European and Indian cultures. The bulky shaving horse held the wood being worked on with the drawknife, which required two hands to hold it. The crooked knife, cutting in a similar manner, was held in one hand, while the other gripped the wood being worked. The latter tool therefore fitted in well with a nomadic life style. It also had the additional function of scooping out spoons, platters and bowls.

The increase in quality of the steel would have had little or no effect on the construction of snowshoes. The change would possibly have allowed the tools to stay sharp longer and have an extended life, but other than that would have made no constructional change necessary in the snowshoe.

Perhaps the greates technological influence was the introduction of twine (Rich, 1938:164,165) (Honigman, 1956:28). This influence was one adopted out of necessity because of the scarcity of hides for the making of rawhide (Ray, 1974:146,147). Of all the many hundreds of samples of snowshoes the writer has examined, he recalls only the two in this study which were laced with string (samples number 4 and 7). From this can be deduced that where the original material was available, it would be used. If not, then twine took its place.

The material used for the frame was birch, which did not change since it was the only local suitable material available. It is unlikely that material was imported, for the wood had to be wet or "green" to have the necessary flexibility to withstand bending. Wood cut in Britain's forests would have dried out by the time it arrived in North America.

It therefore appears that the tools and materials brought in by the Hudson's Bay Company had little influence on Swampy Cree Snowshoe Construction.

The Hudson's Bay Company Influence on Snowshoe Construction Technique

It is not possible to examine snowshoe construction definitively from this point because of a paucity of written material dating from 1671. However, a static trading post supplying the needs of the establishment and the brigades carrying its trading goods and furs would have a number of technologies available to it.

York Boats were built to ply the inland waterways. To construct them steam boxes were built to steam and make pliable the planking and members of their frames. This technique is known to have been used at Fort Edmonton and would have been used on the river systems closer to Hudson Bay. There is every reason to assume that this technique could have been utilised effectively and efficiently by the craftsmen of the forts and trading posts. This system,while being efficient in terms of manufacturing large numbers of snowshoe frames, (Rich, 1954:181) would not have been as attractive a proposition for the Swampy Cree. For them, the limited number of snowshoe frames required would have been more easily produced by using their traditional methods.

The use of jigs by the trading post tradesmen cannot be ruled out, for these were important techniques in a variety of cottage industries (Jenkins, 1966:5, fig. 62, facing 60, fig. 69, facing 61). It is assumed that the transference and adaptation of these skills and knowledge would not have been difficult, for the craftsmen of those days understood and were constantly challenged by materials throughout their life. The specific context of a jig would be in the forming of the upturn and curves of the snowshoe frame. With a few nailed planks and dowels an efficient and effective bending and drying jig for 15 or 20 frames could be constructed. It is assumed that the Swampy Cree did not produce snowshoe frames, except for their own use,and would therefore probably not use a jig. However, if he was in the employ of the

Hudson's Bay Company, he might well have used them under the direction of the trading post tradesmen. George Spurrell (Davies, 247,248), writing to the Hudson's Bay Company Directors on August 1, 1738, from the Prince of Wales Fort, says

> And as to starved Indians, when any are here we observe they was always employed in hunting and making snow-shoes etc. at proper seasons for the use of the factory, which useful necessaries we cannot do without....

However, no mention has been found of the use of this technique.

The writer has observed a number of jigs being used by the Fox Lake Cree, but these are considered an impractical answer to the problem of manufacturing large numbers of snowshoes. The jigs are cumbersome and designed to cope with the single frame left or right and not the large numbers required to be produced. Instead the simple method of tying with string is considered the best approach. With the nomadic life of the Swampy Cree a jig would not have been a practical piece of equipment to carry around. All that appears to be needed, based on observations at Fox Lake, is 2 or 3 feet of lacing and a couple of spacing bars to hold the frames apart while they were drying. The lacing could be used again and the spacing bars thrown away; they are easy to replace.

Influence of Electricity on Snowshoe Construction Techniques

The introduction of electricity into such isolated posts as Fox Lake (1963) has allowed a range of power tools to be potentially available to the Swampy Cree. These could conceivably have some influence on snowshoe construction. In the case of the Fox Lake Swampy Cree it has speeded up production and taken away some tediousness, but these craftsmen do not let the power technology govern them. They realise that the wood governs what they can do with it, as Dickason says (1972:69,70): "The material was selected with function in mind; the shape was worked out as suggested by material...". The Fox Lake Cree work with the material. To this end they split the birch for frames and do not saw it on the power saw until the second stage of reducing the wood blank to a frame when they taper it (Fig. 22). The only other power tool used on the frame is the drill which is used in making the selvage thong holes and for removing wood in the front crossbar slot. In both cases the hand drill or knife could be used, but a power hand drill speeds up production.

CONCLUSION

It appears, therefore, that the influence of changing technologies on traditional Swampy Cree snowshoe construction has been negligible. The only real influence which could be construed was that the tools brought in by the Hudson's Bay Company traders were made from steel. This allowed for greater efficiency in speed and fineness of construction. However, the Swampy Cree population had a reverse technological influence, for they dictated what form these steel tools would take. They were very specific to the conditions of the Swampy Cree way of life and would not have been used in areas with static populations such as those found in Europe.

More recently, with the introduction of electricity, the speed and efficiency of snowshoe construction has improved. However, the basic material, birch, dictates how it can be worked to produce the graceful curve of the upturn. It is this fact that precludes mass production of the traditional Swampy Cree snowshoe.

Chapter 8

SUMMARY AND CONCLUSIONS

Summary

The Swampy Cree Indians were a loosely knit group of peoples living on the West shores of Hudson's Bay and James Bay. They lived in a harsh environment, cold in winter and mosquito ridden in summer. Their mode of travel in winter was on snowshoes which were developed from the materials of birch and animal hide, both in plentiful supply over the land they ranged.

Their first indirect contact with the European technology was through the trading of beaver skins for the worn out tools and cooking implements of the Ottawa Indians who lived to the South of them. The Hudson's Bay Company, chartered in 1670, arrived off the West coast of Hudson's Bay in the summer of 1671 in search of furs for trade, in particular beaver. It was not long before the Swampy Cree were well equipped with efficient steel tools and guns which allowed them to expand West in search of fur on the vast system of waterways, lakes and rivers rising in the West and North-West. Their movement in winter was on snowshoes without which long distance travel on traplines was impossible. The best fur was collected in winter, and it was these two facts of efficient travel for the best fur in winter which placed such an economic dependency on the snowshoe.

Vast numbers of different knives, traps and cooking implements were traded into the Canadian interior from the Hudson's Bay Company stores. These steel tools were used in shaping the birch wood frames of the snowshoes and in scraping the hide of the animals to remove the hair. The fleshing of the hide was, and still is, carried out with bone tools. The wooden frame, made by the man, was then laced by the women using thin line cut from the prepared rawhide. The particular tools which were invaluable to the man, and must have considerably increased his efficiency, were the canoe or crooked knife and the crooked awl. With these tools there was little he could not make for his every day needs. For the woman the introduction of the steel scraper decreased her labour and the difficult task of scraping hides.

The inhabitants of the trading posts also made snowshoes, and in a particularly large establishment the carpenter appeared to be responsible for the manufacture of frames, although everyone was expected to help if needed. In areas where there was an absence of suitable material for frames or hides for lacing, an exchange between trading posts was arranged. The Chief Factors of the trading posts were well aware of the desirability of having native women on their staff complements. They were well able to prepare the hides and lace snowshoes and had skills not shown by the European inhabitants. The tools used in the trading posts were of European origin and were not adaptable to nomadic life. Their use was therefore confined to the trading post.

Materials used for making the tools was of local origin if made from bone or wood and could be replaced easily. If the tools were made of steel, then a number of difficulties were encountered. The most serious was the poor quality of the steel axes. They often shattered in the intense cold, and the problem was not entirely solved until after 1824 when soft iron axe heads received a hard steel insert or overcoating to their cutting edges.

Construction methods and techniques of the Swampy Cree Snowshoe were obtained by the reading of available historical literature and the observation of the construction of snowshoes at the Fox Lake Reserve. Six inch diameter birch trees were split and cut down to size, using an axe and crooked knife. Boiling of the frame toes and the insertion of spacing bars created the lateral curves. The toes were bent back towards the tail and fastened in place with string. Mortices were cut and the crossbars inserted. Hides were prepared by women who fleshed and scraped them. They were then left to dry. When needed, the rawhide was soaked and cut up into suitable lengths for lacing. The lacing pattern used was of the hexagonal type.

The characteristics of the Swampy Cree snowshoe were broadly defined from a sample of ten pair of authenticated Swampy Cree snowshoes contained in collections or museums across the country. An eleventh pair of snowshoes, collected from the Fox Lake Reserve, was included in the sample and compared with the whole sample to verify its authenticity as having Swampy Cree snowshoe characteristics. The ratios of width to length and upturn to length were compared. Cross sectional ratios of width to height of the frame were taken and compared. These were related to the required performance of the snowshoe and the restrictions placed upon its forming by the material. The method of attaching the selvage thonging to the frame was examined, and particular attention was paid to its positioning on the front toe crossbar.

The functions of the crossbars were discussed and shown to be essential to this type of snowshoe. The main crossbars held the frame apart and carried the load of the user. The auxilliary crossbars held the frame apart and kept the netting from bowing in. A third type of crossbar, called a multiple tension support, held together the toe of the snowshoe. The lacing thickness was largest and strongest in the centre snowshoe section and smallest in the toe and tail sections which reflected the different functions of supporting the body weight and floatation of the snowshoe in total.

The impact of changing technologies on the handcrafting of traditional Swampy Cree snowshoe appears to have been extremely limited. Increased efficiency has resulted from the use of steel tools. These tools were of North American origin with European equivalents, e.g. the crooked knife and the draw knife. However, the steel tools were especially constructed in Europe to North American patterns and needs and reflected an accommodation on the part of the traders. The design of the Swampy Cree Snowshoe does not appear to have changed a great deal through the years of the study period which reflects a design suitable for the environment in which it is used.

Conclusions and Recommendations

The writer feels that new material has evolved from the close examination of a well known type of snowshoe. This has been possible through a thorough understanding of the working of materials by hand. The construction and use of the related tools, as used by the Swampy Cree, has given a greater comprehension of the processes and techniques involved. Similarly practical experience in traditional techniques of snowshoe construction has given insights so necessary for a full understanding of the fine points of technique and manufacture.

The scope of this study, although extensive, has not covered important factors which still need to be determined. It has also, out of necessity, covered only one major type of snowshoe, while many are in existence.

The following factors need to be determined for the Swampy Cree snowshoe as they also need to be determined for other types of snowshoes.

Type determination. Snowshoes should be grouped together under easily identifiable names which express their generic origins. There appear to be many names for a given snowshoe type. This type determination would include snowshoes which to date have received very little attention but deserve examination because of their uniqueness, e.g. the Thompson Indian snowshoe or the assymetrical snowshoes used by a number of native groups in Western Canada.

Structural and flotation characteristics. The structural characteristics leading to a further defining of a snowshoe type should be made of all major types of snowshoes. It should include details of flotation characteristics and the response to movements of the user as he travels over a variety of terrain and varying snow conditions.

Constructional technique characteristics. The varying snowshoe types will no doubt require methods of holding, or devices which are used to hold the frame while it is being worked upon. Technique characteristics should be recorded for each snowshoe type.

Tools. A study of the tools used or associated with snowshoe construction will reveal those which are of general distribution amongst snowshoe makers or specific to a type. This could well include alternative tool designs used by different user groups manufacturing the same snowshoe type.

Material characteristics. Wood and rawhide have limitations to their structural uses. These should be defined and the extreme of the limits determined.

Design functionality. The use to which the snowshoe type is put should be compared objectively with its design. The question should be asked: Is it the best possible design within the material characteristic range for its use? Suggestions should be made of designs which would better serve its purpose. Experimentation of alternative types could then procede.

Influence of snowshoe types on neighbouring designs. The interrelated influences on neighbouring snowshoe traits could give some information on the origins of design characteristics.

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APPENDIX I

FOX LAKE INTERVIEWER FORMAT

Frame Material

What type of wood is used for snowshoe construction?

Where is the wood obtained?

What methods are used to season the wood?

How is the material cut to length?

What methods are used to cut and shape the frame to the correct cross sectional size?

Frame Construction Bending

How is the lateral bend of the main frame obtained?

What methods are used to obtain the vertical bending of the snowshoe toe?

Frame Construction, Final Preparation

What are key ratios in determining the mortise position for the crossbars?

How are the mortises cut?

How are the crossbars constructed?

What determines the position of the holes for lacing?

How is the selvage thong positioned and laced?

Rawhide Lacing

What type of animal hide is used for the snowshoe lacing?

What processes are involved in making the rawhide?

How is the rawhide cut to width and length?

Lacing and Final Finishing of the Snowshoe

How is the rawhide prepared for lacing?

What method is used to weave the lacing?

Does the snowshoe receive a final finish?

Are any decorations applied?

Miscellaneous

Are there any additional comments?

APPENDIX II

SNOWSHOE CLASSIFICATION RECORDING FORM

SNOWSHOE BACKGROUND

1. State the snowshoe type as used by Davidson

2. Name the museum or collection in which the snowshoe is contained.

3. Give the artifact number given by the museum or collection.

4. Give the date of construction, if known, or date on which it was accepted by the museum or collection.

5. Give the name of the individual who originally used the snowshoe.

6. If the owner belongs to or belonged to a specific

Indian group, give the name of this group.

7. Indicate the area in which the snowshoe was used.

8. Make two drawings of the snowshoe, one from the side and the other from directly above it. Show the basic outlines and give the dimensions of these. Indicate the width of the snowshoe at each crossbar.

9. Additional comments, especially in regards to handicraft processes and uses of materials used in its construction.

FRAME CONSTRUCTION

10. Name the material used in the frame construction.

11. State the number of pieces used in making the frame.

12. State where the frame is joined (place X on the diagram in 8 above).

13. State how the frame is joined together.

14. Draw, with dimensions, representative cross sections of the frame at each crossbar/frame intersection. Start from the toe and heel crossbars.

Cross Section of Frame at the Crossbars and tail				Center Section	Tail Section
Toe Section					
4	3	2	1	1	Tail

15. Describe the colour and type of finish on the crossbar.

16. Describe the decoration on the frame. Draw examples below with dimensions.

17. Draw the method of attachment of the selvage thong to the frame.

i) Toe Section

ii) Tail Section

18. Additional comments, especially in regards to handicraft processes and uses of materials in the frame.

CROSSBARS

19. Name the material used in the crossbar construction.

20. State the number of wooden crossbars.

21. State the number of rawhide auxilliary crossbars.

22. Draw the method of attachment of the selvage thong to the front crossbars.

23. Draw in the cross section of the crossbars.

Cross section of X Bars.			Method of fastening to frame.		
4	3	2	1	1	2

24. How are the crossbars joined to the frame. State whether the recesses are mortised and tenoned, drilled and round crossbar section inserted, or, in the case of any recess not at a right angle, draw a cross-section of the frame giving details.

M=Mortice & Tenon		D=Drilled, incl. angle through frame			
4	3	2	1	1	2

25. Describe the colour and type of finish on the crossbar.

26. Describe the decoration on the crossbars. Draw example(s) below with dimensions.

27. Additional comments. Especially in regards to handicraft processes and uses of materials in the crossbar.

RAWHIDE LACING

28. Name the material used in the lacing.

Snowshoe Sections	29 Width and thickness of lacing	30 Type of weaving	31 Number of open spaces within 2" length
Front			
Middle			
Rear			

32. State the method of joining the rawhide lacing to lengthen it.

33. State the colour and finish applied to the lacing.

34. State the number and types of amulets tied to the frame.

35. Draw any decorations which are painted on or woven into the lacing.

36. Additional comments. Especially in regards to handicraft processes and uses of materials in the weaving.

HISTORICAL BACKGROUND

37. List any known historical facts relating to this pair of snowshoes.